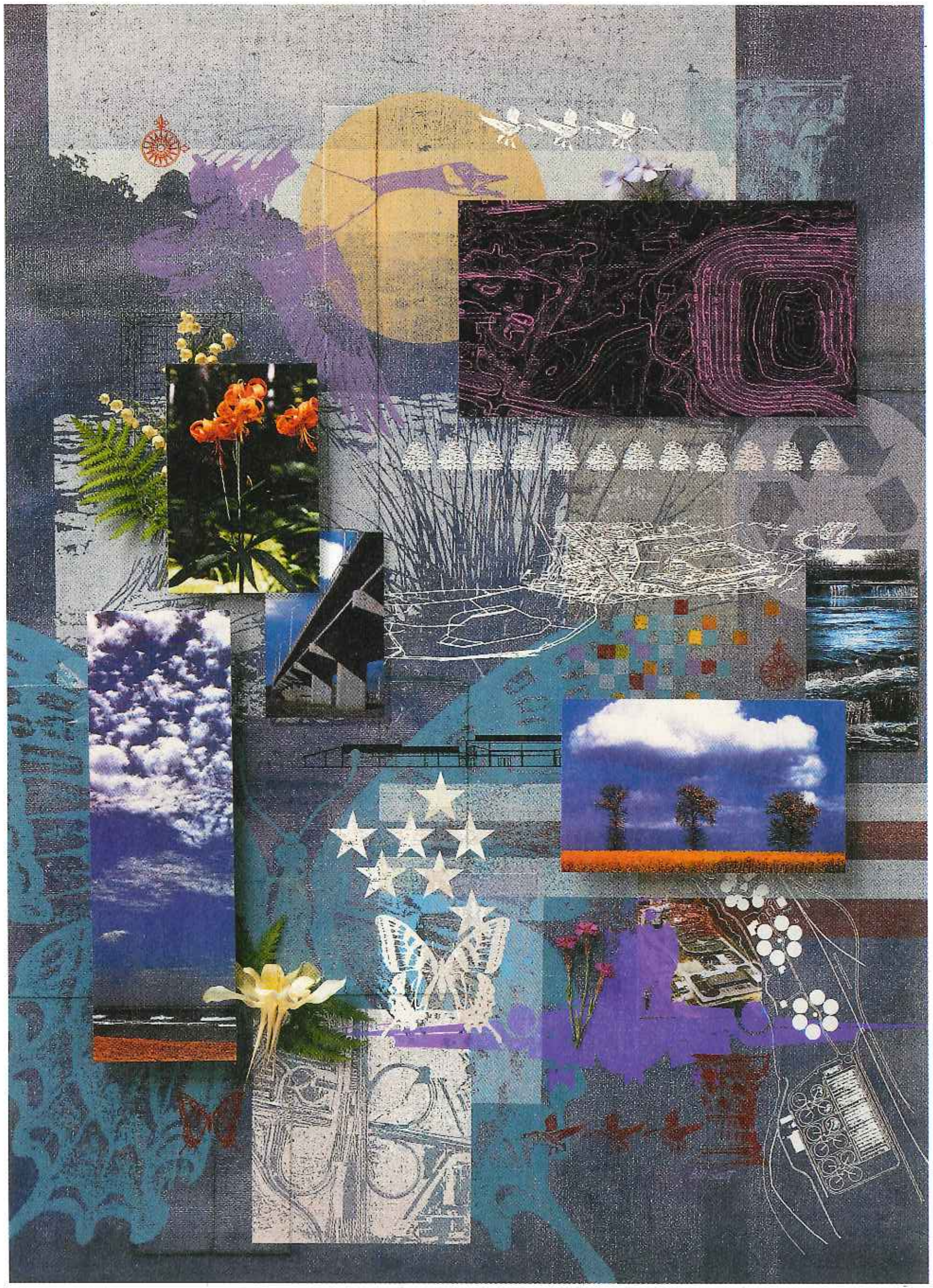
Quality • Integrity • Creativity • Responsiveness



Quality through teamwork

RCRA Facility Investigation (RFI) Phase I Work Plan

Chemical Waste Management
Vickery, Ohio

U.S. EPA ID No.
OHD 020 273 819

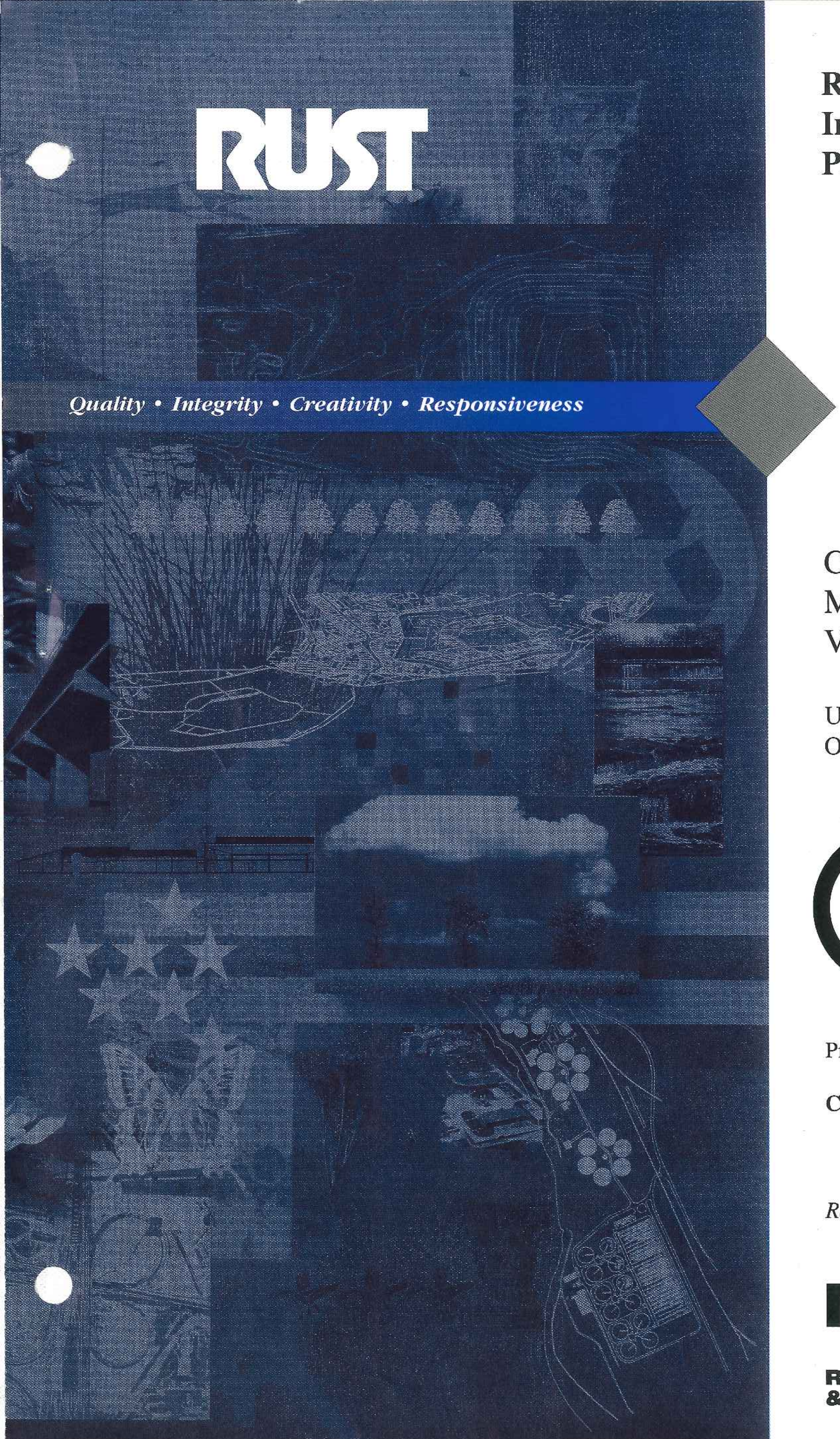
Prepared for:

CWM - Vickery, Inc.

Revised October 1998

RUST

Rust Environment & Infrastructure



RCRA Facility Investigation (RFI) Phase I Workplan

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RUST

Rust Environment & Infrastructure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

October 29, 1998

REPLY TO THE ATTENTION OF

DW-8J

CERTIFIED MAIL: 371 896 648
RETURN RECEIPT REQUESTED

Fred G. Nicar, General Manager
Waste Management of Ohio, Inc.
Vickery Facility
3956 State Route 412
Vickery, Ohio 43464

RE: Final Approval RCRA Facility Investigation (RFI) Workplan and Quality Assurance Project Plan (QAPP), Chemical Waste Management, Inc. Vickery Facility (CWM-Vickery) OHD 020 273 819

Dear Mr. Nicar:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the Waste Management of Ohio, Inc.- Vickery (WM-Vickery) October 15, 1998 Response to Comments and have determined the responses to be complete. The October 15, 1998 submission was in response to U.S. EPA's deficiency letter of September 14, 1998, commenting on WM-Vickery's August 25, 1998, submission required by U.S. EPA's July 21, 1998, requirement that WM-Vickery modify its RCRA Facility Investigation (RFI) work plan and quality assurance project plan (QAPP) to adhere to the U.S. EPA's new method of sampling and analysis of volatiles in soils.

U.S. EPA has determined WM-Vickery has met the conditions identified in U.S. EPA's September 11, 1997, Conditional Approval letter and subsequent modification requirements associated with the revised soil sampling requirements.

Please note that WM-Vickery shall conduct all field work associated with its RFI only during the times personnel of the U.S. EPA, or its designatees are present, unless U.S. EPA determines otherwise. WM-Vickery must notify the U.S. EPA Project Manager at least two weeks prior to beginning field work associated with the RFI. The U.S. EPA Project Manager must also be notified at least two weeks prior to any sampling activities that are connected with the RFI. The U.S. EPA may require any or all soil, groundwater, surface water, or sediment samples collected by WM-Vickery be split with the U.S. EPA at the time of collection.

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

FEDERAL EXPRESS

October 15, 1998

Mr. Thomas Matheson HRP-8J
U.S. Environmental Protection Agency
Region V
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Subject: Response to Comments - RCRA Facility Investigation (RFI) - Workplan
Vickery Facility, Chemical Waste Management, Inc.
EPA I.D. #OHD020273819

Dear Mr. Matheson:

In response to your letter dated September 14, 1998 which was received on September 16, 1998, attached are three (3) copies of revised pages of the Workplan and Quality Assurance Project Plan.

Copies have been sent to the Ohio Environmental Protection Agency as requested and a copy will be place in the WMO Vickery Information Repository. Should you have any questions regarding this matter, please contact Steve Lonneman at (419) 547-7791.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,
WASTE MANAGEMENT OF OHIO, INC

F.G. Nicar

F.G. Nicar
General Manager

Attachments

cc w/attachment: Edwin Lim, OEPA DHWM Columbus
Chuck Hull, OEPA NWDO Bowling Green
CWM Vickery Information Repository

Waste Management, Inc.

3956 State Route 412 • Vickery, Ohio 43464 • 419-547-7791 • Fax: 419-547-6144

FEDERAL EXPRESS

August 25, 1998

Mr. Thomas Matheson HRP-8J
U.S. Environmental Protection Agency
Region V
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Subject: Response to Comments - RCRA Facility Investigation (RFI) - Workplan
Vickery Facility, Chemical Waste Management, Inc.
EPA I.D. #OHD020273819

Dear Mr. Matheson:

In response to your letter dated July 21, 1998, attached are three (3) copies of revised pages of the Workplan and Quality Assurance Project Plan.

Copies have been sent to the Ohio Environmental Protection Agency as requested and a copy will be place in the CWM Vickery Information Repository. Should you have any questions regarding this matter, please contact Steve Lonneman at (419) 547-7791.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,
WASTE MANAGEMENT, INC

F.G. Nicar
General Manager

Attachments

cc w/attachment: Edwin Lim, OEPA DHWM Columbus
Chuck Hull, OEPA NWDO Bowling Green
CWM Vickery Information Repository

RESPONSE TO SEPTEMBER 14, 1998 U.S. EPA COMMENTS
VOLATILES IN SOILS
WASTE MANAGEMENT OF OHIO, INC. VICKERY FACILITY
PHASE I RFI

Comment No. 1

Table 1-2 in the QAPP indicates that all VOCs in soil data would be reported using the low concentration analysis. However, it does not anticipate circumstances when a high level concentration (>200 ug/kg) might have to be reported. Note that a methanol preserved vial will be collected for each sampling point anyway. What is the anticipated data usage for VOCs data in which the reporting limit will be <200 ug/kg? Alternatively, for the WM-Vickery RFI, perhaps the extra vial reserved for high level analysis could be a sample in which only 1 to 2 grams of soil has been added. Perhaps this circumstance could be reflected in a footnote to the table.

Response

The low concentration method is anticipated for all volatile samples. However, a methanol-preserved sample for high concentration analysis will be taken at each volatile soil/sediment sampling site and will be used if high volatile concentrations(>200 ug/kg) are encountered. Three EnCore samplers will be used for each volatile soil/sediment sample, as indicated in Sections 5.7.1, 5.7.2, and 5.7.3 of the Work Plan. The contents of two of these samplers will be preserved at the laboratory using sodium bisulfate (low-concentration method analysis), and the contents of the remaining sampler will be preserved at the laboratory using methanol (high-concentration method analysis). Sections 5.7.1, 5.7.2, and 5.7.3 of the Work Plan have been modified to explain the type (sodium bisulfate or methanol) and location (laboratory) for this preservation.

Comment No. 2

The GP Environmental Services, Inc. (GP) SOP allows for a number of options, which are outlined in the SW-846 5035 method. The sampling plan must detail whether sample vials collected for high level concentration analysis will be sent to the field with methanol already added, or if these samples might be collected using an EnCore sampler prior to immersing these same samples in vials containing methanol in the laboratory. Also, it should be explained whether a 40 mL or 60 mL vial will be used for this purpose. (Bulk samples should not be collected for high level concentration analyses even though this is an allowed option in method 5035. See comment 18 below.)

Response

As indicated above, Sections 5.7.1, 5.7.2, and 5.7.3 of the Work Plan have been modified to indicate that the soil/sediment VOC samples will be preserved at the laboratory. These sections have also been modified to indicate that the preservation will occur in 40-mL vials.

The use of 40-ml vials is described in the revised SOP section 6.2.1.8. Also see item 9 below. Only EnCore samplers will be used to collect soil/sediment VOC samples, so bulk samples will not be collected for VOC analyses.

Comment No. 3

The procedure associated with section 2.3 is not summarized. Should mention be made of the polyethylene glycol (PEG) solvent here? Will this sub-option of the GP SOP most likely be implemented?

Response

This option is allowed by the method, and should therefore remain in the SOP. However, it is highly unlikely that this option will be implemented, because no high level samples are expected.

Comment No. 4

In section 5.1, add the phrase "...of SW-846." to the end of the sentence.

Response

The requested phrase has been added to SOP section 5.1.

Comment No. 5

It would be appropriate to mention or reference the procedures to be followed in the event calcareous effervescing soils are encountered in section 6.1.1.3. The "NOTE" in section 6.2.1.2 could be referenced.

Response

SOP section 6.1.1.3 has been revised to include a procedure to be followed if samples effervesce.

Comment No. 6

In section 6.1.3.5, change the phrase, "added to the sample" to "added to the vial containing the soil sample". If the high level concentration (field-preserved) option is used (in lieu of the low level concentration technique), then it would be acceptable to abandon use of the MS/MSD samples for the high level analysis. This is because the matrix being audited would be the methanol soil extraction matrix, not a soil matrix, which would be of lesser interest for the intended purpose of assessing matrix effects.

Response

The requested phrase has been added to SOP section 6.1.3.5.

Comment No. 7

In the "NOTE" in section 6.2.1.2, add reference to the procedure that will be used for sample preservation if soil samples are found to effervesce. (Also, analogous changes should be made to the sample holding time and preservation table in the QAPP.) If soil will effervesce, sodium bisulfate preservative should not be used. Instead reagent grade organic free water should be substituted in 40 mL sample vials. Then samples should be shipped on ice for a period not to exceed two days. They must then be stored for no longer than 12 days at a temperature of less than minus 10 degrees C prior to analysis.

Response

SOP section 6.2.1.2 has been revised as requested.

Comment No. 8

In section 6.2.2.3, correct a typo. "Screw cap".

Response

SOP section 6.2.2.3 has been corrected.

Comment No. 9

In section 6.2.1.8, how many EnCore samplers should be taken per sample location (in lieu of sample collection using 40 mL vials)? This procedure should be described in detail in the Field Sampling Plan as well.

Response

SOP section 6.2.1.8 has been revised to indicate the collection of three (3) EnCore samplers at each soil/sediment VOC sample location, and the use of 40-mL vials by the laboratory for sample preservation. As noted above, Sections 5.7.1, 5.7.2, and 5.7.3 of the Work Plan describe the collection of three (3) EnCore samples at each soil/sediment VOC sample location. These sections have been revised to describe preservation of these samples.

Comment No. 10

Referring to section 6.2.3, aliquots for dry weight determination should only be taken after the aliquot for methanol preservation has been subsampled (i.e. by adding aliquot to the methanol container). The practice of collecting an unpreserved sample for high level analysis is not recommended however. (reference - "Clarification Regarding use of SW-846 Methods", August 7, 1998.)

Response

Aliquots for dry-weight determination cannot be taken from the EnCore samplers, since the entire sampler contents are used for volatiles analysis. Dry-weight determination will be performed on a different subsample, which will be collected immediately after the EnCore sample is collected. If any soil/sediment sample requires only VOC analysis (i.e., an additional bulk sample will not be collected for analysis of other parameters), a separate aliquot will be collected for dry-weight determination. Sections 5.7.1, 5.7.2, and 5.7.3 of the Work Plan have been revised to include this requirement for any soil/sediment sample that requires only VOC analyses.

Comment No. 11

Modify the sample storage procedure in section 6.4 based on discussion in comment 8 above.

Response

This comment is unclear, as "comment 8 above" discusses a minor typo, and does not address sample storage. However, SOP section 6.4 has been modified to include both the current 48-hr holding time for sample preservation and the 14-day holding time for sample analysis, as well as special preservation instructions for effervescing samples.

Comment No. 12

The intention of the instructions presented in section 7.1.1.4 is unclear. Referring to the 3rd sentence, surely the calibration standards are not shipped to the field, are they? This must be clarified.

Response

The intention of section 7.1.1.4 is to provide for matrix matching between samples and calibration standards. The calibration standards are not shipped to the field. Section 7.1.1.4 has been modified accordingly.

Comment No. 13

In section 7.1.2, is the standard indicated here supposed to be an independently prepared calibration standard?

Response

The standard referenced in SOP section 7.1.2 is the continuing calibration verification. The requirements for CCVs are set forth in other GP SOPs and are not repeated here, but are incorporated by reference.

Comment No. 14

In section 7.1.3.3, the contents of the matrix spiking solution should include all of the key VOC compounds of concern for this project for the soil matrix. These compounds should be identified in the QAPP, Table 1-2.

Response

Section 3.2 and Table 1-2 of the QAPjP have been revised to indicate that VOC matrix spike samples will contain all of the VOCs of concern.

Comment No. 15

Method 8015 is mentioned in section 7.1.4, when perhaps method 8260B should be referred to (instead or) also.

Response

The subject sentence states that for "method 8015 compounds" (i.e., BTEX and related compounds), a shorter time period is allowable. This statement has been removed from section 7.1.4 of the SOP to avoid any confusion.

Comment No. 16

Section 7.2 refers to section 7.3.1, which is not present in this SOP.

Response

The SOP section numbering has been corrected accordingly.

Comment No. 17

Is the procedure referred to in section 7.2 intended to be used when an oily soil sample is encountered? The relation of this section to section 6.2.3 is unclear.

Response

The procedure in section 7.2 is intended to be used for all high-level samples, whether oily or not, including both methanol-preserved and unpreserved samples. This section of the SOP has been rewritten to avoid any confusion. As noted above, high-level analyses are not expected to be necessary.

Comment No. 18

Section 7.2 refers to weighing soil samples on a top-loading balance prior to analysis. This step would undermine the closed-system strategy and intent to produce data that is as accurate as possible. Therefore, it is not recommended that this procedure be utilized for the WM-Vickery RFI project.

Response

This procedure appears in the SOP because it is an option allowed by the method; it has therefore been left in the SOP. However, this option will <u>not</u> be used for this project because it is only for unpreserved VOC samples. Only preserved VOC samples will be analyzed for this project.

Comment No. 19

Section 7.2.6 refers to section 7.5, which is not in the SOP.

Response

The SOP section numbering has been corrected accordingly.

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SECTION 1
INTRODUCTION

This Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) Phase I Work Plan (WP) has been prepared by Rust Environment & Infrastructure (Rust) for Chemical Waste Management Inc. (CWM)-Vickery. This Phase I RFI is being completed under the direction of the United States Environmental Protection Agency (U.S. EPA) as a condition to the issuance of a Part B Permit to CWM-Vickery dated October 24, 1994. Corrective Action Requirements, as documented in the Part B Permit and in accordance with Section 3004 (u) of RCRA, must be instituted as necessary by CWM-Vickery to protect human health and the environment from all releases of hazardous waste(s) or hazardous constituent(s) from any solid waste management unit (SWMU) at the facility, regardless of the time at which the waste was placed in such units. These Corrective Measures, whether on-site or off-site, will be addressed by conducting an RFI, Corrective Measures Study (CMS), and the Corrective Measure Implementation (CMI), as necessary. This WP describes the activities to be conducted during the Phase I RFI.

The purpose of an RFI is to thoroughly evaluate the nature and extent of the releases, if any, of hazardous waste(s) or hazardous constituent(s). This Phase I RFI WP includes several plans to describe the procedures that will be followed during implementation of Phase I field activities. As always, when conducting field investigations, it may be necessary to revise the RFI Phase I WP to increase or decrease the detail of information collected to accommodate facility-specific situations.

This RFI Phase I WP is divided into the following specific plans:

- Data Management Plan (DMP)
- Project Management Plan (PjMP)
- Public Involvement Plan (PIP) and Schedule of Activities.
- Health and Safety Plan (HASP)
- Quality Assurance Project Plan (QAPjP)

Each of the above plans will be described in detail in later sections. A brief description of each of the plan's contents are presented in the following sections.

1.1 Data Management Plan

A DMP has been prepared in order to document and track the Phase I RFI data and results. The DMP describes the procedures Rust will follow to identify and establish data documentation materials and procedures, project file requirements and project-related progress reporting procedures and documents. The DMP also provides the format to be used to present the raw data and conclusions of the Phase I RFI. The DMP is presented in Section 6.0.

1.2 Project Management Plan

Rust has prepared a PjMP that discusses the Phase I RFI's technical approach, and list of personnel. This PjMP describes the qualifications of the personnel performing and directing the Phase I RFI and includes a description of key subcontracted personnel. The intention of this plan is to present the overall management approach to the Phase I RFI. The PjMP is presented in Section 7.0.

1.3 Public Involvement Plan and RFI Schedule

1.3.1 Public Involvement Plan

The PIP has been prepared to document the procedures CWM-Vickery will use to incorporate public involvement activities that may be required as part of the Phase I RFI. These activities may or may not include: preparation of fact sheets, public communication, and maintaining a repository of all information gathered as part of the Phase I RFI. The PIP is presented in Section 8.0.

1.3.2 Phase I RFI Schedule

A schedule for the implementation of the Phase I RFI is located at the back of Section 7.0. This schedule graphically presents the anticipated amount of time to complete each task of the Phase I RFI. This schedule is only estimated as it is difficult to predict outside influences (i.e., weather, equipment, etc.). However, all efforts will be utilized to maintain the original schedule.

1.4 Health and Safety Plan

A Phase I RFI HASP has been developed to provide a safe working environment for personnel during the implementation of the Phase I RFI. This HASP describes all health and safety measures needed for all of the activities planned for the Phase I RFI. This HASP has been developed in accordance with all applicable regulations and Rust corporate policy. The Phase I RFI HASP has been developed in conjunction with the CWM-Vickery TSD Facility's Emergency Response and Contingency Plan. The Phase I HASP is presented at the end of the RFI WP.

1.5 Quality Assurance Project Plan

A QAPjP has been prepared to ensure that all information, data, and resulting decisions are technically sound, statistically valid and properly documented. The QAPjP provides all monitoring procedures, sampling, field measurements and sample analyses that will be performed during the Phase I RFI. U.S. EPA guidance documentation relating to quality assurance (QA), quality control (QC) and chain-of-custody (COC) procedures by the U.S. EPA were used in the development of the QAPjP. The QAPjP is presented at the end of the Phase I RFI WP.

SECTION 2
BACKGROUND

2.1 Site Location and History

The CWM-Vickery Treatment, Storage and Disposal (TSD) Facility is located in a rural, unincorporated area of Sandusky County in the north-central part of Ohio. The CWM-Vickery TSD Facility's active area encompasses 98 acres and is located adjacent to State Route 412 near the intersection of State Routes 510 and 412. The CWM-Vickery TSD Facility is bounded by Highways 412 and 510 on the south and east, and by the Ohio Turnpike on the north. A portion of the property extends to County Road 244 on the west. The geographic coordinates of the facility are north latitude 41° 22' 19" and west longitude 82° 22' 40". The unincorporated community of Vickery lies 2 miles northeast of the site, and the cities of Clyde and Fremont are located approximately 4 miles to the south and 6 miles to the west, respectively. The location of the CWM-Vickery TSD Facility is presented in Figure 2-1.

The CWM-Vickery TSD Facility provides for the treatment, storage and disposal of liquid hazardous waste. Operations began in 1958. The site began as Don's Oil Service and in 1970 changed its name to Ohio Liquid Disposal (OLD). Waste Management, Inc. (WMI) acquired the facility in 1978 and later transferred it to Chemical Waste Management (a wholly owned subsidiary of WMI).

The facility began operation as an oil recovery service to provide hauling of waste oil from neighboring industries to a central facility and recovery for eventual resale. As time went on the facility started to accept various industrial wastes and stored them in surface impoundments. In 1964 the operators were granted permission by the State of Ohio to accept chemical process waste and more surface impoundments were constructed. As the inventory of wastes increased the operators began searching for a suitable means to dispose of them. In 1972, OLD was granted permission to drill a test hole to evaluate the subsurface conditions for the possible location of an injection well. After a number of years of applying for approval to use the injection well, being denied, and appealing, approval was finally granted to OLD to inject waste into subsurface wells drilled on the site. A total of 7 injection wells were drilled on-site throughout the history of the facility (Injection Wells 1, 1A, 2, 3,4, 5 and 6). The locations of the injection wells are presented in Figure 2-2.

During the history of the facility a total of 12 surface impoundments existed. The locations of the former surface impoundments are presented in Figure 2-3. These surface impoundments were constructed between 1964 and 1975. As injection of wastes began, the surface impoundments were closed, and between 1979 and 1992 all of the surface impoundments were closed. Details of these closures can be found in Section 6.0 of the Report on Current Conditions (December 1994, Revised April 1995). Injection Wells 1, 1A and 3 were plugged and abandoned due to mechanical and physical failures. Presently, Injection Wells 2, 4, 5 and 6 are active on-site. These injection wells are regulated under four Underground Injection Control (UIC) permits maintained at the facility. Additional information regarding the injection wells can be found in the Report on Current Conditions.

Additional facilities used at the site to treat, store and dispose of wastes included landfarming activities and an Oil Recovery Facility.

In order to provide for the disposal of the wastes generated during the closure of the surface impoundments and by other treatment facilities, CWM-Vickery was granted an approval to construct a Toxic Substances Control Act (TSCA) closure cell. The closure cell was built between 1986-1988. Waste from a temporary waste pile was finally given approval to be moved into the closure cell in 1990. The waste in the closure cell is comprised of stabilized wastes from the closure of the surface impoundments, and from specific facilities detailed in a 1984 Consent Decree. A number of the surface impoundments across the site were certified clean-closed (i.e., Ponds 4, 5, 7, 11 and 12) and these closures were approved by the Ohio Environmental Protection Agency (OEPA). Approval letters are presented in Appendix A. The current layout of the CWM-Vickery TSD Facility is presented in Figure 2-2.

2.2 Present Conditions

Presently, CWM-Vickery receives a large variety of liquid hazardous wastes. The most common types include: pickle liquors, acid wastes, caustic wastes, neutral wastes, and other aqueous wastes including landfill leachate. The facility does not accept radioactive wastes, infectious wastes, explosive or shock sensitive wastes, air reactive wastes, compressed gases, reactive wastes that generate dangerous quantities of toxic or explosive gases when acidified, bulk ignitable wastes, bulk wastes containing >5% Volatile Organic Compounds (VOCs), or wastes that the facility deems cannot be managed properly.

2.3 RCRA Facility Assessment

In 1990, Jacobs Engineering Group (Jacobs), was subcontracted by the U.S. EPA through Metcalf & Eddy to perform a RCRA Facility Assessment (RFA) at the CWM-Vickery TSD Facility. As part of this RFA, Jacobs conducted a Visual Site Inspection (VSI) to verify and identify SWMUs and Areas Of Concern(s) (AOC) that were identified during a preliminary review. Jacobs identified 45 SWMUs and 5 AOCs. As part of the RFA Report, a detailed description of each SWMU and AOC was presented.

According to the schedule presented in the Part B Permit granted to CWM-Vickery, a Report on Current Conditions was to be submitted in order to update the U.S. EPA on the current conditions at the CWM-Vickery TSD Facility since the RFA was completed. CWM-Vickery submitted a Report on Current Conditions to the U.S. EPA in December 1994 and a revised version in April 1995. This report documented the current conditions at the CWM-Vickery TSD Facility and identified an additional 7 SWMUs and 4 AOCs for a total of 52 SWMUs and 9 AOCs. The U.S. EPA subsequently identified the TSCA closure cell as another SWMU. The total number SWMUs identified on-site is now 53. In response to the Ohio Environmental Protection Agency (OEPA) concerns regarding the area around monitoring well L19, this area has been added as an AOC. The total number of AOCs is now 10. The SWMUs and AOCs identified at the site are presented in Figures 2-4 and 2-5, respectively.

In the past, all site stormwater was managed by the presence of perimeter dikes. The runoff from the main site area drained to a storm water retention basin south of the railroad where it was retained by a sluice gate. The retained water was discharged to Meyers Ditch through this sluice gate once or twice a year after quality testing and approval by the OEPA. Water retained by the containment dikes north of the railroad tracks around Injection Wells 5 and 6 was allowed to pond and evaporate. Water used to pond on the site in many areas. Drainage outside the perimeter diked area flowed to Little Raccoon Creek via the roadside ditches along State Route 510, or into Meyers Ditch. Surface runoff in the extreme northwest corner of the property entered Raccoon Creek via the roadside ditches created for the Ohio Turnpike. Drainage patterns during this time of operation are presented in Figure 2-6.

The site runoff was changed to its present configuration with the implementation of the Surface Water Management Plan. Presently the site runoff is controlled by a ditch and flow control gate system. The runoff is either contained or allowed to discharge from the site at selected locations. Drainage outside the site operational perimeter dike system flows into Little Raccoon Creek via roadside ditches along State Route 510, or into Meyers Ditch near the west-central portion of the facility. Meyers Ditch leaves the site at the northern boundary under the Ohio Turnpike. The present drainage plan for the facility is presented in Figure 2-7.

SECTION 3
SITE DESCRIPTION

3.1 General Information

The topography of the CWM-Vickery TSD Facility is relatively level with elevations generally ranging from 600 to 616 feet above mean sea level (MSL) with a slight dip to the north. The CWM-Vickery TSD Facility and its topography have been altered throughout history with the construction of surface impoundments, closure cells, structures and the closure of the surface impoundments. Additionally, non-facility structures such as the abandoned railroad grade and the Ohio Turnpike embankment have altered the natural topography of the area.

3.2 Geology and Soils

3.2.1 Site Bedrock Geology

Bedrock under the CWM-Vickery TSD Facility is composed of dolomites of the Salina Group. The dolomite is found from 40 to 50 feet below ground surface (bgs) at elevations ranging from 552 to 576 feet above MSL. Boring information available from previous investigations indicate the bedrock surface to be somewhat variable, although for the most part, it is sloping gently downward towards the north. The bedrock surface appears to have a small valley running approximately north/south through the center of the site. Detailed rock core logs collected during previous investigations conducted at the facility indicated the bedrock here is a mixture of shale, dolomite, gypsum, and anhydrite. The variation of the bedrock type makes correlation of the bedrock across the site difficult. However, a black shale does appear to exist across most of the site. This black shale is interbedded with gypsum layers of varying thickness. The dolomite that is present is very shaley with various amounts of gypsum present. Within the upper 30 feet of this unit, the dolomite is extensively and variably fractured and jointed, and contains numerous partially filled anhydrite and gypsum-filled voids and solution cavities up to ½ inch in diameter. These discontinuities are persistent throughout the site.

Since 1983, bedrock hydraulic conductivity data have been collected from site-specific studies, employing aquifer pumping tests. Prior to hydrogeologic investigations at the site, the Ohio Department of Natural Resources (ODNR) conducted large-scale aquifer pumping tests within the bedrock, 3 miles to 10 miles south of the site (ODNR, 1970). Reported hydraulic conductivities ranged from 2.0 x 10^{-2} to 3.2 x 10^{2} centimeters per second (cm/sec). For the site, reported hydraulic conductivities for the bedrock aquifer range from 5.5 x 10^{-3} to 2.0 x 10 cm/sec, as referenced in Bowser-Morner (1983), Golder (1983, 1993) and Dames and Moore (1983). The high variability in extent and amount of the discontinuities within the bedrock can easily explain the variation in reported hydraulic conductivities derived from pumping test data. Based upon packer tests, pumping tests and in-situ well tests, Golder (1988) determined an average hydraulic conductivity of 6.0 x 10^{-3} cm/sec for the bedrock aquifer.

3.2.2 Site Glacial Geology

The overburden which exists on-site consists of two types of glacial deposits. At the surface is a silty clay and clayey silt lacustrine deposit, approximately 10 to 20 feet in thickness. The lacustrine material is underlain by a glacial till approximately 30 feet thick, which lies directly on top of the bedrock. These two soil deposits, the lacustrine material and the glacial till, can be subdivided even further. A cross section of the site geology is provided in Figure 3-1.

The till unit consists of two separate tills: a thin (0 to 10 feet thick) lowermost unit consisting of material derived from the bedrock; and a thick clay-rich upper unit. The lower till contains considerable amounts of sands and gravels, many of which are composed of soft weathered gypsum. This lowermost basal till is not found continuously across the site. It represents an early glaciation and apparently was partially eroded by a subsequent glacial re-advance.

The upper till deposit consists of a silty clay with some sand and traces of gravel. From site specific data, hydraulic conductivities within this upper till deposit range from 7.0 x 10^{-7} to 6.0 x 10^{-9} cm/sec. The material was derived from lacustrine silts and clays that were deposited in a proglacial lake during a previous retreat of the glacial ice and reworked by a subsequent glacial re-advance. The upper surface of the silty clay till was probably undulating with a probable relief of 5 to 20 feet. The upper few feet of the till material, although texturally identical to the lower portion, appear to be slightly different structurally in that there is a suggestion of lacustrine lamination. This agrees with geological literature (Forsyth, 1965) that a water modified till is present in several places in northern Ohio, sandwiched between a till and overlying lacustrine material. The water modified till consists of till material that was deposited into or through water and, therefore, can contain some of the characteristics of a lacustrine deposit. Transport distances, however, would be very short, as shown by the lack of sorting.

The lacustrine material overlying the till material can also be subdivided into two groups. Generally the lower 5 feet contains some fine sand and silt layers alternating with clay layers; however, even the fine sand and silt layers contain considerable amounts of clay. The thickness of the layers ranges from very thin up to one-half inch. A composite grain-size analysis of a sample from this unit indicates that it has a composition of 3 percent sand, 55 percent silt, and 42 percent clay. The same sample also is documented as having a horizontal permeability of 8.6×10^{-8} cm/sec. The reported range of hydraulic conductivities based upon in-situ well tests and laboratory tests for this unit is 8.3×10^{-5} to 1.9×10^{8} cm/sec. Some of these layers are documented as being brown, rather than gray, indicating oxidation has occurred sometime during the postdepositional history of the unit.

This lower stratified portion of the lacustrine material is not found continuously across the facility. However, the lower portion of the lacustrine deposit is documented as appearing to be continuous across the active part of the facility where the lagoons were once located. It most probably represents a time period, shortly after deglaciation, when the proglacial lake was first formed in front of the ice. The varve-like lamina may be caused by seasonal fluctuations in sediment input from the nearby melting ice, or may represent periodic but not seasonal influxes.

The remaining upper lacustrine material consists of an average of 49 percent clay, 46 percent silt, and 5 percent sand, and some of the samples collected across the site contained gravel. The material is very homogeneous with almost no indication of fine sand or silt layers present, although most samples collected were laminated.

The dense, fine-grained glacial till, and deposits of glaciolacustrine silt and clay comprise the most common aquitards found in the northern portion of the United States the hydraulic conductivity reported for this material is commonly in the range of 1.0×10^{-8} to 1.0×10^{-10} cm/sec (Freeze and Cherry, 1979). The Wisconsin-aged till found beneath the site acts as an aquitard to the bedrock aquifer (Golder, 1988). The reported range of hydraulic conductivity for the glacial till found beneath the site ranges from 7.0×10^{-7} to 6.0×10^{9} cm/sec. These values were determined from laboratory tests and from in-situ well tests, as discussed in Bowser-Morner (1983) and Golder (1983, 1988 and 1993). The laboratory tests produced values ranging from

2.6×10^{-8} to 8.4×10^{-9} cm/sec, while the well tests produced values ranging from 7.0×10^{-7} to 2.0×10^{-8} cm/sec. The in-situ well tests produced values approximately one order of magnitude higher than the laboratory tests.

It has been observed that in some locations in the Great Plains of the U.S., deposits of clayey or silty till and glaciolacustrine clay have networks of hair-line fractures that are predominately vertical or near vertical. The distance between fractures varies from centimeters to several meters, and the fractures are commonly infilled with calcite or gypsum. The soil matrix adjacent to the fractures is commonly distinguished by a color change caused by several different degrees of oxidation or reduction (Freeze and Cherry, 1979). Fractures of this type have been recognized in the upper portions of both the glaciolacustrine clays and the upper till beneath the site. None of these fractures were reported open (Golder, 1990).

Many explanations as to the origin of these fractures have been proposed. In areas of glacial till and lacustrine clay, highly fractured zones are common within several meters of the ground surface. Shallow fractures are caused primarily by stress changes resulting from cycles of wetting and drying, and freezing and thawing. Fractures of this nature can produce a secondary porosity within this material (Freeze and Cherry, 1979). The vertical fractures noted at the top of both the glaciolacustrine clay and the upper till beneath the site are suspected of being formed in this manner. Other mechanisms that form fracture systems at depth may be related to glacial unloading, crustal rebound, and volume changes caused by geochemical processes, such as cation exchange (Freeze and Cherry, 1979). No fractures have been noted beneath the site in the middle to lower portions of the glaciolacustrine clay or in the lower till.

In many glacial till deposits of the northern U.S., the fractures enhance the groundwater flow capacity. The bulk hydraulic conductivity of the fractured till and clay determined by field tests is commonly one to three orders of magnitude larger than values of intergranular hydraulic conductivity determined by laboratory tests on non-fractured samples (Freeze and Cherry, 1979). The effects of the fractures upon the hydraulic conductivity of the glaciolacustrine clay have been noted by Golder (1985). In their study, hydraulic conductivities of the glaciolacustrine clay determined by laboratory methods ranged from 8.6×10^{-8} to 6.1×10^{-9} cm/sec, while in-situ well tests determined the value to be 1.0×10^{-6} cm/sec. Due to the presence of suspected open fractures (with an estimated fracture porosity of 0.001) within the upper portions, the in-situ tests were determined to produce a more representative approximation of hydraulic conductivity, as the wells may have penetrated or may have been affected by these fractures, while the laboratory soil samples may not have included any of these fractures. In-situ tests produced values of two to three orders of magnitude greater than the laboratory tests.

Laboratory tests of glacial till beneath the site produced hydraulic conductivities ranging from 2.6×10^{-8} to 8.4×10^{-9} cm/sec, while in-situ well tests produced values ranging from 7.0×10^{7} to 2.0×10^{-8} cm/sec. The in-situ tests are approximately one order of magnitude greater that the laboratory tests, within the reported one to three orders of magnitude difference between in-situ well tests and laboratory tests discussed by Freeze and Cherry (1979). The hydraulic conductivity of the glacial till, based upon the presence of fractures, may therefore be more accurately calculated using the data generated by in-situ well tests.

Vertical permeabilities of the upper lacustrine material are on the order of 1×10^{-8} to 1×10^{9} cm/sec. Horizontal permeabilities are expected to be similar because of the high clay content and the lack of well-sorted sand lamina. The upper lacustrine deposit was laid down in relatively quiet water some distance from the ice front. The small amounts of gravel present may have been rafted in on melting ice sheets.

3.2.3 Surface Soils

The surface soils on the site consist of the Del Ray and Lenawee Series. Both soils were formed on lacustrine deposits. The Lenawee Series contains more clay than the Del Ray Series, but otherwise they are very similar. Both soils contain stratified silts and clays in their lower portions.

3.3 Hydrogeology

3.3.1 Previous Investigations

The site hydrogeology has been thoroughly studied by previous investigations performed at the site. The first significant hydrogeologic investigation at the CWM-Vickery TSD Facility was conducted by Bowser-Morner (1983). This study produced information on the hydrogeology of the site and a statistical analysis of the groundwater quality data. The majority of site-specific studies that followed the Bowser-Morner investigation were conducted by Golder Associates.

These site-specific studies reevaluated the hydrogeologic system based upon additional data and focused on specific issues concerning the hydrogeologic and monitoring systems. A listing of site-specific hydrogeologic studies performed at the CWM-Vickery TSD Facility is included in Table 3-1.

3.3.2 Groundwater Flow in the Bedrock

Groundwater flow in the dolomite bedrock under the facility has been interpreted from water level data collected over several years. Regional groundwater flow direction for the site, as interpreted from regional potentiometric data presented in Figure 3-2, is generally to the north and to the northwest, towards Lake Erie. Bowser-Morner identified a radial flow pattern which is produced by pumping the on-site truck wash well.

The bedrock units are quick to respond to pumping stresses at the site. This is typical of a confined aquifer with fracture flow. When pumping ceases, these units quickly recover to the natural gradient conditions, with groundwater flow to the north and northwest.

Based on a review by Golder using collected data and experience with similar geologic materials, the hydraulic conductivity representative of the dolomite aquifer underlying the site is 6×10^{-3} cm/sec or 125 gallons/day/ft^2. The reported range of hydraulic conductivity is 3.2×10^{2} to 2.0×10^{-4} cm/sec. The major recharge for the dolomite aquifer in this area occurs roughly 3 miles to the southeast of the facility, where the bedrock surface rises to within several feet of the ground surface.

3.3.3 Groundwater Flow in the Surficial Deposits

The potentiometric surface in the lacustrine soils is higher in elevation than the potentiometric surface of the glacial till, which is higher in elevation than the potentiometric surface of the dolomite aquifer. The decreasing pressure with depth causes a downward vertical gradient toward the dolomite. However, the amount of flow through the overburden at the site is likely to be inconsequential, due to its low permeability, in relation to the amount of recharge to the aquifer from off-site. Average vertical flow times from lacustrine soils to bedrock, as calculated by Golder (1988), have been estimated to be on the order of 100 years. Apparently, Golder (1988) calculated this composite travel time using a flow rate of 0.025 feet/day in 15 feet of glaciolacustrine clay and a flow rate of 0.001 feet/day through 35 feet of glacial till, producing an estimate of 97.5 years.

Using an estimated vertical hydraulic conductivity of 2.0 x 10^{-8} cm/sec for the overburden materials (glaciolacustrine clay and glacial till), a nominal thickness of 50 feet for the overburden, and a groundwater head difference of 10 feet between the overburden and the bedrock, Golder (1990) calculated a vertical gradient of 0.2. Using an effective porosity of 0.1, a vertical flow velocity of 0.04 feet/year was estimated. For an overburden thickness of 50 feet, travel time from the surface of the overburden material to the bedrock aquifer equates to 1,250 years.

The overall water level elevation data from shallow monitoring wells completed within the overburden materials indicate a trend of decreasing potential to the northwest, which is generally the direction of ground surface slope. The range of hydraulic conductivity of the lacustrine soils and the glacial till is 8.5 x 10^{-5} to 1.0 x 10^{-7} cm/sec, and 7.0 x 10^{-7} to 6.9 x 10^{-9} cm/sec, respectively.

Based upon in-situ well tests, Golder (1988) calculated hydraulic conductivities of the glaciolacustrine clay ranges from 8.2 x 10^{-5} to 2.3 x 10^{7} cm/sec, with a geometric mean of 1.0 x 10^{-6} cm/sec. Calculated hydraulic conductivity based upon in-situ well data from the glacial till ranges from 7.0 x 10^{-7} to 5.2 x 10^{-8} cm/sec, with a geometric mean of 2.0 x 10^{-7} cm/sec. In addition, Norris and Fiddler (1971) provide a range for hydraulic conductivities of till in north central Ohio as 1.0 x 10^{-7} to 3.5 x 10^{-8} cm/sec. Based upon this information, Golder (1988) classifies both the glaciolacustrine clay and the glacial till as aquitards.

Dense, fine-grained glacial till, and deposits of glaciolacustrine silt and clay are the most common aquitards in most of the northern U.S. These deposits have hydraulic conductivities typically in the range of 1.0 x 10^{-8} to 1.0 x 10^{-10} cm/sec. Using a hydraulic gradient of 0.5 (which is the upper limit of gradients observed in these aquitards) and a hydraulic conductivity of 1.0 x 10^{-9} cm/sec, nearly 10,000 years would be required for water to flow through a 10 meter (33 feet) thick non-fractured layer of this material (Freeze and Cherry, 1979).

SECTION 4
PROJECT OBJECTIVES

The objective of the Phase I RFI is to obtain the necessary data to characterize the site and determine potential risks to human health and the environment. The data obtained during the Phase I RFI should be of sufficient quality and quantity for making decisions, conclusions, and recommendations necessary to allow the investigation to proceed to Phase II, and ultimately to CMS and CMI, if necessary.

Many investigations have been completed at the CWM-Vickery TSD Facility, but none have adequately determined the extent of potential contamination of soils around all of the SWMUs. However, a number of the investigations and studies completed at the site have documented the geology and hydrogeology. The results of these studies and investigations have provided a detailed description of the regional and facility-specific geologic and hydrogeologic characteristics affecting the groundwater flow beneath the facility.

Bowser-Morner's report titled "Hydrogeologic Assessment, Northern Ohio Treatment Facility, Vickery, Ohio" dated May 3, 1983 summarized the results of a hydrogeologic assessment of the facility. The purpose of this work was to prepare a detailed assessment of the hydrogeology and an analysis of the groundwater quality. This assessment was performed in accordance with the special terms and conditions set forth by the Hazardous Waste Facilities Approval Board (HWFAB) in the site permit issued in December, 1981. This report, as well as others (i.e., Golder has also conducted previous studies which summarized hydrogeologic conditions, groundwater quality and flow characteristics and geotechnical conditions at the site), will be used to provide the necessary data to adequately characterize the hydrogeologic and geologic conditions at the site.

Additional hydrogeologic information is provided in Appendix C. This information includes water level hydrographs for all monitoring wells on-site from 1986 to 1995, monitoring well construction details, precipitation data for 1995, two reports which discuss tritium analysis, and hydrogeological vertical flow nets. This information was provided to U.S. EPA's consultant Dr. Wayne Pettyjohn to substantiate vertical flow of groundwater within the lacustrine and glacial till zone on-site.

Due to the availability of this existing data characterizing the subsurface geology and groundwater flow systems, the level of effort planned for the Phase I RFI will be limited to the investigation of the soils, sediment and groundwater which may have been affected by contaminant releases from the identified SWMUs and AOCs. This Phase I RFI WP, therefore, proposes work focusing on identifying indications of contamination, if any, at the site.

The Phase I RFI at the CWM-Vickery TSD Facility is specifically focussed on determining if releases have actually occurred. This will be done through determining if there are any hazardous waste constituents in the soils adjacent to and underlying the identified SWMUs and AOCs, or in the sediments of surface streams draining the site. If so, The Phase I RFI report will propose specific and focussed investigations to assess the extent and risk-impact of those releases, including investigation of groundwater and off-site surface water receptors.

The Phase I RFI will also include preliminary characterization of the groundwater in the areas around the land-based SWMUs and AOCs. This will be done by using the soil sampling proposed in this Phase I WP and a combination of historical and newly acquired groundwater monitoring data. The soil sampling data will be used to determine if releases have occurred in certain SWMUs and AOCs. If the soils are found not to contain contaminants, the presence of groundwater contamination remains unlikely.

Historical groundwater sampling data from the uppermost flow system (in the lacustrine sediments) and the uppermost aquifer (the dolomite bedrock) have shown no evidence of contamination. To determine if this data can be used for the RFI, analytical results from the three most-recent rounds of historical sampling will be validated (as described below), and a confirming round of sampling and analysis will be performed during the Phase I RFI. This validation and confirmation activity will be performed on selected lacustrine and bedrock monitoring wells located downgradient of land-based SWMUs and AOCs that still contain residual (stabilized) waste materials. These wells are L17, L19A, L20, L25, and L26 and the bedrock wells MW14R, MW15R, MW20R, MW22R, and MW24R (upgradient).

An approach of this nature is being taken because most of the SWMUs and AOCS at the facility were land based units used for the storage of liquid hazardous waste prior to deep-well injection or for the treatment of residuals by land farming. Some of these units have been clean closed and some have been only partially closed. They are underlain by clayey lacustrine and glacial till soils which, based on several years of quarterly groundwater monitoring, have substantially limited the migration of hazardous waste or its constituents into the subsurface.

Historical monitoring data will be presented in tables and 100 percent of the historical data submitted for the ten wells listed above will be validated. Validation of data will conform to the SOP titled "Data Validation Procedures for EPA Level III Data" which is included in Appendix A of the QAPjP. Quality control results will be reviewed for holding times, laboratory blanks, surrogate spikes (or laboratory blank or laboratory control samples for inorganics), matrix spikes (and matrix spike duplicates for organics), field blanks and field duplicates. Sample collection procedures will also be reviewed as part of validating historical data.

The groundwater data evaluation process will include, at a minimum, the following information:

- Laboratory completing the analysis;
- Analytical methods;
- Compounds analyzed;
- Detection and reporting limits;
- Review of sampling plans explaining sampling collection procedures and objectives;
- Type of data (i.e., raw, etc - types of deliverable packages); and,
- Results of data validation where applicable.

A Phase I RFI field investigation will be conducted by collecting soil and sediment samples in specific SWMU groupings and AOCs. The SWMUs have been grouped together using locale, logistics, operational unit similarities and direct interaction with other units within the SWMU group. The SWMU groupings are described in Table 4-1. The groundwater sampling will be conducted as a "stand-alone" activity.

The complete RFI process will be conducted in two phases to allow for adequate evaluation of data collected in each step and support a Quantitative Risk Assessment (QRA). The Phase I RFI will consist of determining if releases have occurred in SWMUs and AOCs identified on-site. The Phase II investigation will determine the extent of contamination, if any, based on the results of Phase I. There should be no need for a Phase III RFI. Prior to the Phase II investigation specific project objectives and Data Quality Levels (DQLs) will be established for each location where contamination is identified during Phase I. Results from Phase I and Phase II will be incorporated into a QRA which will be used to determine the need for correction action.

The objectives of the data collection during the Phase I RFI will be as follows:

- Characterize the nature of residual materials at those SWMUs and AOCs not clean closed by drilling borings and collecting samples of these materials.

- Determine through borings and soil sampling if there are hazardous waste constituents in the soils adjacent to and underlying the SWMUs and AOCs, i.e., have hazardous waste constituents been released beyond the boundaries of the SWMUs and into the environment. This will involve the collection of soil samples from beneath residual waste materials, or the collection of surficial soil samples. During this determination, it may be readily apparent from field observations that hazardous waste constituents are present in the soil, and if so, the borings would be extended to assess the vertical extent of migration.

- Characterize the effectiveness of the clean closure of former SWMUs now underneath the TSCA closure cell by collecting a sample of water from the capillary drain layer. This layer has continual inward flow, and the groundwater flowing into it has traveled through the clean closed soils of the former SWMUs.

- Characterize residual effects of releases to surface water drainage-ways at the site by collecting samples of sediment at exit points from the site, which have been impacted by previous spills.

- Preliminarily characterize groundwater in the uppermost flow system (lacustrine sediments) and the uppermost aquifer (bedrock) downgradient of land-based SWMUs and AOCs that still contain residual waste materials through validation of the three most-recent rounds of historical groundwater monitoring data and the collection and analysis of new groundwater samples from 10 existing monitoring wells.

A Phase I RFI will be implemented to achieve these objectives. The field sampling program is described within the Field Sampling Plan (FSP) which is provided in Section 5.0. The FSP describes the sampling activities and methods to be used during the implementation of the field sampling program.

Phase II of the RFI will be designed to complement the data gathered during Phase I. This may include the collection of additional soil and sediment samples and the installation of new monitoring wells. Further evaluation of groundwater, if needed, will include the additional collection of groundwater samples and will be completed during the Phase II RFI. The content of the Phase II RFI will be proposed at the completion of the Phase I RFI report.

A QRA will be performed using all data collected from the Phase I and Phase II investigations. If unacceptable risks are derived from the QRA, a Corrective Measure Study will be completed.

A complete description of the QAPjP objectives are provided in Section 1.0 of the QAPjP.

SECTION 5
FIELD SAMPLING PLAN

The Phase I RFI at the CWM-Vickery TSD Facility will be conducted to determine and document the presence or absence of residual waste around SWMUs and AOCs. The results of this Phase I RFI will be used to determine areas which require additional characterization. The information from both Phase I and Phase II will be used to perform a QRA to determine the corrective action at this site, if needed, and to support the selection and design of remedial alternatives. This Phase I RFI WP presents the objectives, activities, and analytical and field methodologies to be used.

The FSP for the CWM-Vickery TSD Facility provides the framework for the implementation of the data gathering tasks associated with the Phase I RFI WP. The tasks described in the Phase I RFI WP provide the basis for the types of general activities and sampling locations further delineated in this FSP. As described earlier, the identified SWMUs have been grouped together using locale, logistics, operational unit similarities and direct interaction with other units within the SWMU group. The sampling efforts and the field testing will be specific for the parameters which have been handled in each of these groupings. Specific criteria for sample selection and frequency have been included for each group. A sample collection summary for the SWMUs and the AOCs is presented in Table 1-1 of the QAPjP.

5.1 Data Quality Objectives

Data Quality Objectives (DQOs) are based on the concept that different data uses may require different data quality. The levels of analytical data quality to be utilized during the Phase I RFI are described below:

- Field monitoring of volatile organic compounds (VOCs) will be performed for the following purposes: I) General characterization of possible contaminant levels through casual screening of soil cores; ii) Selection of samples for laboratory analysis through a specified headspace screening of soil samples; and iii) Monitoring of ambient and work-space atmospheres for worker health and safety. This data collection activity will be performed on-site using a field calibrated photoionization device (i.e., HNu). This data will require a screening level of data quality. This level of data quality requires documentation of instrument calibration in accordance with procedures specified by the manufacturer and at a frequency specified in Section 6 of the QAPjP.

- At two of the SWMU groups (Groups A and C), where clean closure has not been performed, samples of the residual materials and the native soils adjacent to and underlying the SWMUs will be collected and will be analyzed for Appendix IX parameters using SW-846 methods to characterize the nature of these materials, and to determine whether there has been a release of hazardous waste or hazardous waste constituents into these soils. This data would serve as the basis for reducing the parameter lists for Phase II of the RFI, and will be used in a QRA. As such, a confirmation level of data quality will be required.

- At six of the SWMU Groups (Groups D, E, F, G, H, and I) and four of the AOCS (A, B, C, and F), soil samples will be collected and analyzed for Appendix IX parameters using SW-846 methods to determine whether there has been a release of hazardous waste or hazardous waste constituents into the native soils adjacent to or underlying these locations. Where field observations indicate that contamination is present in the uppermost native soil, additional soil samples will be collected at greater depths to characterize the vertical extent of migration. These data will be used in a QRA. As such, a confirmation level of data quality will be required.

- At SWMU Group B, a water sample will be collected from the capillary drainage layer that underlies the TSCA closure cell and analyzed for Appendix IX parameters using SW-846 methods. This activity will be performed as part of the Phase I RFI groundwater sampling. This cell was built "over" the clean closed SWMUs #4, 5 and 7. There is continual inward flow to the drainage layer, and the groundwater flowing into it has traveled through the clean closed soils of the former SWMUs. These data will be used in a QRA. As such, a confirmation level of data quality will be required.

- At AOC H, sediment samples will be collected from Meyer's Ditch and Little Raccoon Creek and analyzed for Appendix IX parameters using SW-846 methods to characterize residual effects of the single large release of processed acid wastewater that reached this drainage way. These data will be used in a QRA. As such, a confirmation level of data quality will be required.

- At three SWMUs within Group I (#43, 44, and 45), chloride samples will be collected and analyzed as an indicator of leakage from the SWMUs. These SWMUs are used exclusively for the management of sanitary waste produced at three of the on-site buildings. This data will be obtained at a confirmation level of data quality.

- Groundwater samples will be collected from 10 existing monitoring wells (L17, L19A, L20, L25 and L26, MW14R, MW15R, MW20R, MW22R, and MW24R) to confirm the validation of recent historical groundwater monitoring data from these wells. These monitoring wells are located within the main facility area and positioned to be able to characterize possible releases (if any) from land-based SWMUs and AOCs that still contain residual (stabilized) waste materials. If analytical soil results indicate potential groundwater impacts, the extent of these impacts will be determined in Phase II.

The confirmation level of analytical quality provides the highest level of data quality and includes, but is not limited to the purposes of risk assessment, evaluation of remedial alternatives and establishing cleanup levels. These analyses require full documentation of SW-846 analytical methods, sample preparation steps, data packages and data validation procedures necessary to provide defensible data. Quality control must be sufficient to define the precision and accuracy of these procedures at every step. The sampling and analysis program is summarized in Table 1-1 of the QAPjP.

5.2 Sample Handling and Analytical Requirements

The Phase I RFI will be conducted by collecting soil, sediment and groundwater samples in the identified SWMU grouping (Table 4-1). Sample locations and collection procedures for each media are described in Sections 5.7 through 5.11 of the Phase I RFI WP. The sampling and analysis program for the Phase I RFI at the CWM-Vickery TSD Facility is presented in Table 1-1 of the QAPjP. These procedures have been developed based upon U.S. EPA guidance. Clean, disposable gloves will be worn by sampling personnel during the collection of all RFI samples. Disposable gloves will also be worn while opening sample containers for sample containerization or preservation. Whenever these gloves become torn or the field team leader judges that the gloves may have been contaminated, they will be replaced with a new set of gloves before continuing sampling activities. Sample handling and COC procedures have also been developed for this project based upon U.S. EPA guidance. Field custody procedures are described in Section 5.2.2.

Approximately 10% of the soil samples will be collected and analyzed for geotechnical and geochemical properties. These properties include: Cation Exchange Capacity, Atterberg Limits, moisture content, grain size distribution, soil pH, and Total Organic Carbon (TOC). The American Society for Testing and Materials (ASTM) Specifications and SOPs for these tests are presented in the QAPjP.

5.2.1 Sample Custody

Sample collection and custody procedures are designed so that field custody of samples is fully and continuously maintained and documented. These procedures provide complete identification and documentation of the sampling event and the sample COC from shipment of sample bottleware, through sample collection, to receipt of the samples by the subcontracted laboratory. When used in conjunction with the laboratory's custody procedures and the sample bottleware documentation, these data establish full legal custody and allow complete traceability of a sample from preparation and receipt of sample bottleware to sample collection, preservation, and shipping, through laboratory receipt, sample analysis, and data validation. The COC Record Form is presented in Figure 5-1.

5.2.1.1 Sample Identification and Documentation

After sample collection, all sample containers will be labeled with an identification number that uniquely identifies the sample. The sample identification number will be logged in the field notebook, along with the following information:

- Sampling personnel;
- Date and time of collection;
- Field sample location and depth (if appropriate);
- Observations on ambient conditions;
- Type of sampling (composite or grab);
- Method of sampling;
- Sampling matrix or source;

- Results of field screening;
- Intended analyses;
- Preservation method;
- Observations of significant characteristics of the sample; and
- Observations of significant effect to the sampling procedure.

Sample identification is discussed in Section 6.1.3. Samples shipped to the laboratory will have information transcribed to a sample COC form.

5.2.2 Field Custody Procedures

Field custody procedures are described below as two groups: (1) sample collection procedures that document the sample identification, sampling personnel, sample collection procedures, sample preservation, and ambient conditions during sampling activities; and (2) sample shipment procedures that document handling, packing, and shipping of samples to the laboratory. The sample shipment procedures are presented in the QAPjP in Section 5.1.

The persons responsible for sample custody, and a brief description of their duties, are:

- Laboratory Representative or Commercial Supplier: verifies that the bottleware is certified clean; arranges for bottleware shipment to Sampling and Equipment Manager;

- Rust Sampling and Equipment Manager: receives and stores bottleware that is shipped from a laboratory or a commercial supplier; inspects bottleware for physical integrity; retains bill of lading from shipping courier as documentation of transfer of bottleware; relinquishes bottleware to Field Staff; receives samples from Field Staff; verifies samples to COC form; prepare samples for shipment; retains bottleware and samples under custody until sample shipment; relinquishes samples to shipping courier or to laboratory representative.

- Rust Field Staff: receives bottleware from Sampling and Equipment Manager; collects and preserves samples; relinquishes samples and COC form to Sampling and Equipment Manager.

- Rust Project Manager (PM): Verifies reported laboratory analyses to the sample COC form; assures that COC documentation is incorporated into the project file.

5.2.3 Sample Collection

The following procedures will be conducted during sample collection activities, and will be recorded in a project field notebook and on the sample chain-of-custody form, as indicated below, and on a field quality control form. The field quality control form is presented in Figure 5-2.

5.2.3.1 Field Logbook

Sampling personnel will use a bound field logbook with moisture resistant pages to record pertinent sampling information with waterproof ink. The field logbook identifies project name, project number, project manager and telephone number, and principal street address or geographic location of the site. Daily field activities and sampling information will be entered in the field logbook on dated, initialed, and serially-numbered pages. Corrections will be made to entries by initialed and dated line-out deletions. A diagonal line will be drawn across the remaining blank space of the last page of each day's entry. Each day's entry will be signed and dated by the author.

5.2.3.2 Sample Identification

A unique identification number will be assigned to each sample. This number will be typically an alphanumeric sequence or integer that serves as a mnemonic device or acronym to identify the sample. Specific sample identification procedures are described in the DMP (Section 6.0). All information pertaining to a particular sample will be referenced by its identification number. This number will be recorded on the sample bottleware label, in the field notebook, and on the sample COC form.

Following sample collection, the sample label will be completed in waterproof ink with the appropriate information as shown. The completed label will then typically be secured to the sample container with clear, wide tape.

5.2.3.3 Sample Containers

Rust will use sample containers furnished by the subcontracted laboratory or a commercial supplier. Rust will verify that the laboratory has approved cleaning procedures in their own QAPjP, or that the commercial supplier furnishes laboratory grade, certified clean containers. The source and lot numbers of sample containers used in the sampling event will be recorded in the project field logbook for each sample collected. The lot number may be used to trace the bottleware preparation and certification of cleanliness when the containers are shipped from our equipment manager. When bottleware is shipped directly from the supplier to the field, a formal COC is not normally initiated. In this instance, the airway bill receipt and/or packing slip will serve as the initiation of COC.

5.2.3.4 Sample Location, Sample Media, and Intended Parameters

The specific sampling location of each sample will be recorded with each sample identification number in the field logbook and on the sample COC form. Sampling locations will be referenced to a site location map from the FSP. Other acceptable location references are distance and bearing from a prominent landmark.

The type of sample media will be recorded with the sample identification number in the field logbook and on the COC form.

Laboratory analyses to be conducted on the sample will be recorded with the sample identification number in the field logbook and on the COC form.

5.2.3.5 Date, Time, Personnel, and Ambient Conditions

The date and time of sampling preparation and collection and the personnel who conducted sampling will be recorded with the sample identification number in the field logbook and on the chain-of-custody form. The names of visitors and any other persons at the sampling location during sample collection will be recorded in the field logbook. Sampling personnel will also record in the field logbook the ambient weather conditions, other conditions at the sampling location that may affect sample collection, the apparent representativeness of the sample, and sample analysis.

5.2.3.6 Preliminary Sampling Activities

Sampling personnel will record in the field logbook the preparation activities that may be pertinent to sample collecting at each sampling location. For soil sampling, this documentation may include information on presence of surface staining, water logging or ponding; proximity to roads or waste piles; apparent upgradient physiographic or hydrogeologic features of significance; background volatile vapor concentrations, the sample depth, and the drilling method, equipment, and materials (such as drilling mud) that were used to construct the boring.

5.2.3.7 Sample Collection

Sampling personnel will record in the field logbook the type of equipment used to conduct sampling, the order of sample collection (which will be VOCs, SVOCs, PCBs, pesticides, herbicides, dioxin/furans, and metals as relevant to parameters actually targeted at each sampling location), field screening results measured during sampling collection (such as vapor headspace readings of soil samples), special collection procedures, and aberrations to sampling procedures.

Following collection of the sample, the sample identification number and other information on the sample label will be verified with the entry in the field logbook. Sample identification number, time, and date of collection will be recorded on the COC form.

Following sample labeling verification, the sample will be placed in a cooler with ice packs, and the cooler maintained in the sampler's presence or in a secure location for the remainder of the daily sampling activities, or until custody is transferred to another responsible party. A sample is considered to be in a person's custody whenever it is in a person's physical possession, when it is in view of the sampler or responsible party, or when it is in a secure location. Custody of a sample is also maintained when the sample is shipped in a container that is properly sealed against tampering with custody seals.

5.2.4 Quality Control Sample Collection

Information on QC samples will be recorded in the field logbook, on the sample bottleware label, and on the COC form. Duplicate samples will have the same information recorded as a regular sample. Trip and rinsate blanks will have most of this same information recorded, with the exception that sample location and sample screening and preliminary activities are not applicable. The trip blank will be referenced to the actual samples that it accompanies in shipment and handling. Rinsate blanks are also referenced to the specific decontaminated sampling equipment that they are obtained from.

5.2.5 Field Quality Control Checks

QC checks in the field will include the collection of field QC samples and QC checks of field screening instruments. These QC checks are described below.

5.2.5.1 Field Quality Control Samples

Field QC samples will include field duplicates, matrix spikes (MS) and matrix spike duplicates (MSD), field blanks, and trip blanks. The following sections define each QC sample and provide the collection frequency and analytical requirements.

5.2.5.1.1 Field Duplicates

Duplicate samples will be collected to provide precision information for the entire measurement system including sample acquisition, homogeneity, handling, shipping, storage, preparation, and analysis. Duplicate samples will be selected at random by the Sampling and Analysis Task Manager, and submitted to the laboratory for analyses. Duplicate analyses will be performed for 1 out of every 10 investigative samples for each matrix. Duplicate samples will be analyzed for the parameters of the primary sample (i.e., the sample which is being duplicated).

5.2.5.1.2 Matrix Spike/Matrix Spike Duplicates/Laboratory Duplicates

MS and MSD samples will be collected in the field during sample acquisition and used to assess analytical precision and accuracy for organic analyses. A Laboratory Duplicate (LD) will be used in place of a matrix spike duplicate to assess analytical precision and accuracy for inorganic analyses. MS, MSD and LD analyses will be performed for 1 out of every 20 investigative samples for each matrix. The MS, MSD and LD samples will be analyzed for the parameters of the primary sample (i.e., the sample which is being duplicated).

5.2.5.1.3 Field Blanks

Field blanks are indicative of ambient conditions and/or equipment conditions that may potentially affect the quality of the associated samples. The field blank sample will be obtained by pouring analyte-free or deionized water supplied by the laboratory through sample collection equipment (bailer, etc.) after decontamination, and placing it in appropriate sample containers for analysis. Field blank samples will be collected from all major sampling devices used for the collection of groundwater. Field blank samples will be collected from the sampling devices to provide a representative indication of the success of field cleaning procedures for the same matrix of the initial sample being collected (i.e., field blanks will not be collected for soil and sediment samples). Field blanks will be submitted at the rate of 1 for every 10 aqueous investigative samples.

5.2.5.1.4 Trip Blanks

Trip blanks will be prepared in the laboratory, shipped with the sample containers to the Site, and will be kept with the investigative samples throughout the sampling event. They are then packaged for shipment with the other samples and submitted for analysis. A trip blank will be included with each shipment of aqueous samples requiring VOC analysis.

5.2.5.1.5 Blank Water

The blank water used for the rinsate and trip blanks will consist of demonstrated analyte-free water provided by the laboratory performing the sample analysis. The source of this water will be the same as that of the method/preparation blank. The blank water will be received in the field within one day of laboratory preparation, be on-site for a maximum of two days, shipped back to the laboratory at the end of the second day and be received at the laboratory within 24 hours.

5.2.5.2 Quality Control Checks of Field Instruments

Proper measurement of accuracy and precision of field instruments will be verified by daily instrument calibration and QC checking procedures described in the QAPjP. This information will be recorded in the field logbook and in the Daily Quality Control Report. This information is reviewed daily by the Rust Field Team Leader who audits the accuracy and precision of the field screening instruments. This information will also be audited weekly by the Rust PM.

5.3 Site Security

The objectives of site security during the field investigation are as follows:

- Control access to the site during the Phase I RFI; and,
- Prevent vandalism and theft of equipment

The existing facility operates 24 hours a day, seven days a week. However, it normally is open for receipt of wastes 16 hours (7:00 AM to 11:00 PM) per day, seven days a week.

5.3.1 Control of Unauthorized Entry

The facility is surrounded by a 6 foot-high chain-link fence topped with three strands of barbed wire. Signs are mounted every 100 to 150 feet on the perimeter fence. The signs are visible from 25 feet away and carry the message: "Danger-Unauthorized Personnel Keep Out."

During normal administrative hours, all visitors are required to enter the Office Building, sign a visitor's log, and state their business. All non-complying individuals are treated as unauthorized entrants and are asked to leave the facility.

During off-hours, the fence and locked gates control unauthorized entry into the facility and both vehicle gates are monitored around the clock on closed-circuit television.

5.3.2 Control of Authorized Entry

The facility has two gates used for vehicle entry, both accessible off of State Route 412. These gates are referred to as the "receipt control gate" and the "guardhouse gate." The guardhouse gate is only utilized during times of construction when extensive traffic onto the site is experienced. During normal, non-construction times, only the receipt control gate is utilized for entry to the site.

In the event construction is underway, the guardhouse is manned and the gate is active. It is used by construction and service vehicles and non-waste delivery trucks during daytime hours (6:00 AM to 6:00 PM). All non-employees entering this gate must stop at the guardhouse, sign in, obtain an identification badge, and sign out and return their identification badge when leaving. At their destination, the visitors are under the surveillance of facility personnel. This gate is locked from 6:00 PM to 6:00 AM, and no guard is on duty during these hours. During the field investigation, if the amount of required personnel is large, they will use the guardhouse gate to gain access to the site. The same procedures will be maintained as explained above to monitor and control access of authorized personnel. If the amount of required personnel is small, the receipt control gate will be used.

The receipt control gate is used primarily for waste delivery trucks and all other traffic when the guardhouse gate is closed. Eleven locked emergency gates are also maintained, four on the west fence-line, two on the east fence-line, and five on the south fence-line.

Contractors, consultants, visitors, and other non-employee personnel authorized to enter the facility are normally accompanied by facility personnel while on the premises. Possible exceptions may occur where an individual has a prolonged or a very specific job to perform in a specific area of the facility (e.g., building construction, subsurface investigation). In these cases, facility personnel familiarize the person with the facility and safety emergency procedures to be followed while on-site. These individuals sign a safety declaration form following the safety briefing. While at the facility these individuals sign in daily so that their presence at the facility can be monitored by facility personnel.

5.4 Potable Water Supply

Potable water will be needed during the field investigations for equipment decontamination, grout preparation, and drilling operations. Potable water will be obtained from the Truck Unloading Facility. This water will be drawn from the on-site truck well, if capacity is sufficient. If the capacity of the truck wash well is exceeded, water will be hauled from an outside source. Samples of the water will be collected on an as-needed basis, however one sample will be collected prior to using the water for field operations. This sample will be analyzed for the Appendix IX parameters using appropriate U.S. EPA methods. If an Appendix IX compound is detected, an alternate source (i.e., tanker truck from a municipal supply) will be selected, and an additional sample will be collected and analyzed from this alternate source. If this source is found to be adequate, it will be used for the remainder of the Phase I RFI.

5.5 Phase I Decontamination Procedures

5.5.1 Decontamination Area

The equipment decontamination area for the field investigation will be located at the Truck Unloading Facility. This facility has the available containment and access to the treatment facilities needed to manage the liquids generated during the decontamination process. Equipment decontamination will be centralized in this area. Decontamination water will be treated and ultimately disposed through the deep well system. Personnel decontamination, if required, will be completed in centralized areas where the sampling activities are being conducted. At each of these locations, a bermed decontamination pad will be constructed with plastic sheeting. Portable basins will be used to contain decontamination water during the process. The decontamination water will be poured into a temporary polyethylene tank located near the decontamination area. The decontamination water in the temporary tank will occasionally be pumped out by a tanker truck and disposed through the deep well system.

5.5.2 Decontamination Procedures

Drilling equipment (including drill rods, bits and augers, or any other large pieces of equipment) will be decontaminated using a high pressure steam cleaner prior to the beginning of field activities and between each borehole.

Split spoon samplers and cores tubes, will be decontaminated before use and between boreholes according to the following procedures:

- Wash using laboratory grade glassware detergent and tap water scrub to remove visual contamination;

- Generous tap water rinse; and,

- Distilled and deionized (ASTM Type II) water rinse.

If visual contamination persists, or gross contamination is suspected the following procedures will be completed:

- Wash using laboratory grade glassware detergent plus a tap water wash.
- Generous tap water rinse.
- Distilled and deionized (ASTM Type II) water rinse.
- 1% nitric acid rinse* (trace metal or higher grade HNO_3 diluted with distilled and deionized (ASTM Type II) H_2O)
- Distilled and deionized (ASTM Type II) water rinse*
- Isopropyl alcohol (laboratory grade) rinse**
- Total air dry or pure nitrogen blow out**
- Distilled and deionized (ASTM Type II) water rinse**

 * Only if sample is to be analyzed for metals.
 ** Only if sample is to be analyzed for organics.

All sampling devices will be wrapped in aluminum foil, after the decontamination process in completed. All decontamination information will be recorded in the field logbook.

All other equipment used during the field activities, such as drilling rigs and auger flights, all present potential sources of interference to environmental samples. These items may come in contact with the materials adjacent to the matrix being sampled or may be attached to actual sampling equipment which has been cleaned in accordance with the above decontamination procedures. Heavy equipment may potentially retain contaminants from other sources such as roadways or storage areas or may have soil material from previous job sites that have not been removed.

All heavy equipment will be decontaminated in the truck unloading facility using a combination of pressure/steam cleaning and manual scrubbing. The use of the steam generator will be to remove visible debris. If visible contamination still exists after the steam cleaning is completed, manual scrubbing of the equipment will be completed followed by another round of steam cleaning.

All drilling rig items such as auger flights, rods, drill bits or any other equipment which comes in contact with soils will be decontaminated between boreholes.

5.5.3 Investigation-Derived Wastes

Investigation-Derived Wastes (IDW), includes soil cuttings, drilling muds, decontamination fluids, disposable sampling equipment and disposable personnel protective equipment.

All soil cuttings will be containerized within 55-gallon drums and consolidated within roll-offs staged in the facility's roll-off storage area. Prior to transport, the material will be sampled to determine if the material is classified as hazardous waste or non-hazardous. If the material is classified as non-hazardous, it will be disposed on-site. If the material is considered hazardous, the roll-off container will be sent to a proper TSD Facility.

All decontamination waters generated will be stored and sampled prior to disposal into the CWM-Vickery TSD Facility's deep well injection system. The final disposal of the decontamination waters will depend on the acceptance or not acceptance as determined by the CWM-Vickery TSD Facility's waste analysis plan and waste acceptance criteria. In the unlikely event that the injection well system cannot accept the IDW, it will be properly disposed at an approved off-site facility. Disposable sampling equipment and personal protective equipment (PPE) will be double bagged and transported to an appropriate disposal facility.

5.6 Health and Safety Procedures

Health and safety procedures which will be implemented during the field activities are described in the HASP.

5.7 Soil Sampling Procedures

Sampling procedures for the collection of surface soil, subsurface soil, and sediment samples are provided in the following sections. These procedures will be used to collect the samples, if required. The description of each of the SWMU Groups and AOC sampling protocol are presented in their representative Section (5.9).

5.7.1 Subsurface Soil Sample Collection Procedures

Separate soil sampling procedures will be used to collect subsurface soil samples depending on the sample location. Two sample locations are proposed for the Phase I RFI: soil samples collected at grid node locations and soil samples collected at select locations. The procedures described below (in Sections 5.7.1.1 and 5.7.1.2) are for borings drilled within SWMUs that were previously used as surface impoundments. Similar soil sampling procedures will be used when collecting soil in SWMUs that were not surface impoundments. When the procedures are modified at a specific SWMU or SWMU Group, the modifications will be discussed in the section describing that SWMU or SWMU Group sampling plan. The procedures for collecting these soil samples are described in the following sections. All geological information collected during the drilling of soil borings will be recorded on the Borehole Log Forms presented in Figure 5-3.

5.7.1.1 Grid Node Location Sampling Procedures

The purpose of "grid node" sampling is to obtain samples of natural soil material from a uniform, specific depth (2 to 4 feet) below the bottom of the (former) SWMU. Thus, the first objective during drilling is to determine the depth to the bottom of the (former) SWMU. The second objective is to collect a soil sample for laboratory analysis from the natural soil approximately 2 to 4 feet below the bottom of the (former) SWMU.

The first objective at "grid node" locations will be accomplished in the following manner:

- A borehole will be advanced using hollow stem augers (HSA) and a five-foot continuous, split-barrel corer will be advanced simultaneously within the HSA to allow the field geologist to record a continuous visual record of the soils.

- The first core will be retrieved when the boring is at a depth of two and one-half feet. Subsequent cores will be retrieved at five-foot intervals or when the behavior of the drilling rig suggests that a different material has been encountered.

- The field geologist will note important interfaces with depth, changes in lithology and record a detailed description of the material encountered.

A Photoionization Detector (PID) will be used to screen the cores as they are removed. This information will be recorded for qualitative purposes and be used to obtain background readings on the gross VOC concentrations of the soil. The core will be screened using the following procedures:

- The PID will be in-place next to the core and as the core barrel is opened the PID will measure the gross VOC concentration from the core.

- The readings will be recorded on the borehole log by the field geologist.

- In areas where PID readings are elevated relative to others, the field geologist will split the core with a stainless steel pocket knife and screen the material within the core. These readings will also be recorded on the borehole log. Core information will be recorded on a borehole log form as presented in Figure 5-3. In order to track daily progress, a summary of daily production of drilling will be recorded. A daily production form is presented in Figure 5-4.

When the depth of bottom of the (former) SWMU has been determined, the HSA and corer will be used to advance the boring to a depth two feet below that (bottom) depth. A sample of natural soil will then be collected for laboratory analysis using the following procedures:

- A split spoon sampling device will be driven into the soil at the appropriate sampling interval. This sampling interval will be approximately 2 to 4 feet below the bottom of the (former) SWMU. (If fixed waste is not identified within the borehole during coring, the soil sample will be collected at 2 feet below the deepest recorded depth of the associated SWMU.)

- The split spoon will be opened, and a VOC sample will be collected immediately using three EnCore™ plunger-type samplers. The VOC samples will be collected from soil in the uppermost portion of the split spoon. The VOC samples will be sealed in a Ziploc® type bag, and the bag will be placed in a field cooler to await transportation to the laboratory for Appendix IX VOCs analyses. Preservation of these samples will occur at the laboratory within 48 hours of sample collection. Two of the samples will be preserved at the laboratory using sodium bisulfate, and one will be preserved using methanol. Preservation will occur in 40 ml vials.

- Additional soil will be collected from the split spoon for the laboratory analysis of the remaining Appendix IX parameters and placed into laboratory provided sample jars.

- A separate aliquot of soil will be collected and placed in a 4 oz. glass jar for any soil sample that will be analyzed for VOCs only. The soil in this jar will be used for dry weight determination. For soil samples that will be analyzed for VOCs as well as other parameters, dry weight determinations will be made using bulk-sample soil that is not needed for other analyses. Collection of a separate aliquot for dry weight will not be necessary for samples that will not be analyzed for VOCs.

All samples will be labeled and placed within the field cooler to await transportation to the laboratory. The internal temperature will be maintained at 4°C. The borehole will then be abandoned in accordance with the procedures described in Section 5.8.

Where field observations indicate that contamination is present in the 2-to-4-foot sample, one additional soil sample will be collected at a greater depth to characterize the vertical extent of contamination. The borehole will be advanced using HSAs and the continuous corer, and the retrieved soil core will be screened as described above. When it appears that contamination is no longer present, a second soil sample will be collected as described above for the 2-to-4-foot sample.

5.7.1.2 Selected Location Sampling Procedures

The purpose of "selected" sampling is to characterize potential residual contaminant "sources" within the (former) SWMUs. This will be accomplished by continuously sampling soils from the ground surface until borehole termination criteria (described below) are met. Controlled headspace screening of soil samples will be done to identify the depth interval containing the highest concentrations of VOCs. The sample from this depth interval will be submitted for laboratory analysis. The borehole will be advanced using HSAs and the split spoons used will be the same sampling devices used during the collection of soil from the grid node locations. Headspace screening will be conducted on all split spoon samples. Headspace screening will be conducted in the following manner:

- The split spoon will be removed from the borehole and soil from the uppermost portion of the split spoon will be collected using three EnCore™ samplers. The EnCore™ samplers will be paced in a Ziploc® type bag, labeled, and placed within a field cooler.

- The remaining soil from the EnCore™ sampled portion of the split spoon will be placed in a Ziploc® type bag and labeled with the sample identification number then placed within a crock pot filled with hot water.

- The Ziploc® bagged soil sample will be kept within the hot water for approximately 15 minutes.

- After the 15 minutes, a PID will puncture the bag and the headspace reading on the PID will be recorded on the headspace analysis form as presented in Figure 5-6.

- During the 15 minute heating interval, soil for the laboratory analysis of additional Appendix IX parameters will be collected from the other brass sleeve sections and placed into laboratory supplied sample jars. The sample jars will be labeled and placed within a field cooler with its internal temperature maintained at 4°C for transport to the laboratory.

The soil samples collected from the sampling interval within the former SWMU materials with the highest gross VOC concentrations based on the results of the above headspace analysis method will be sent to the laboratory for analysis. Where field observations indicate that contamination is present in the uppermost native soil beneath the SWMU, two additional samples will be collected for analysis: 1) a sample of uppermost native soil and 2) a soil sample from a greater depth to characterize the vertical extent of contamination. To collect the "vertical extent" sample, the borehole will be advanced using HSAs and the continuous corer, and the retrieved soil core will be screened for VOCs. When it appears that contamination is no longer present, the "vertical extent" soil sample will be collected for analysis.

If gross VOC concentrations are not detected within any of the soil sampling intervals, a sample will be sent to the laboratory for analysis based on visual identification from a combination of the grid node location borings and the borehole being sampled. The borehole will be terminated when the following criteria are met:

- Headspace analysis of gross VOCs are not detected,

- Identification of soils encountered do not indicate visual contamination, and;

- Historical information supports the decision (i.e., depth of termination is below recorded bottom depth of surface impoundments).

Borehole abandonment procedures are described in Section 5.8.

Preservation of the VOC samples will occur at the laboratory as indicated in Section 5.7.1.1. Collection of an additional soil sample for dry weight determination also will occur as described in Section 5.7.1.1.

5.7.2 Surface Soil Sample Collection Procedures

Surface soil samples will be collected in the following manner:

- A split spoon sampler will be driven between an interval of 0-2 feet bgs.

- The uppermost soil within the split spoon will be collected with three EnCore™ samplers and sent to the laboratory for analysis of Appendix IX VOCs. Preservation of the VOC samples will occur at the laboratory as indicated in Section 5.7.1.1. Collection of soil for dry weight determination also will occur as described in Section 5.7.1.1.

- Additional surface soil samples for the laboratory analysis of the remaining Appendix IX parameters will be collected from the remaining soil in the spilt spoon and placed in laboratory clean jars. The sample jars will then be placed within a field cooler with its internal temperature maintained at 4 °C for transport to the laboratory.

Where field observations indicate that contamination is present in the 0-to-2-foot sample, one additional soil sample will be collected at a greater depth to characterize the vertical extent of contamination. The borehole will be advanced using HSAs and the continuous corer, and the retrieved soil core will be screened as described above. When it appears that contamination is no longer present, a second soil sample will be collected as described above for the 0-to-2-foot sample.

The hole left by the sampling device will be filled with granular bentonite, and potable water will be poured into the bentonite to hydrate it.

5.7.3 Sediment Sample Collection Procedures

Because effective sediment sampling requires samples to be collected from depositional areas, field personnel will use field observations to determine the exact sampling site. Typical depositional areas are located downstream of obstructions in the water, or areas of turbulent flow. The specific sampling location will be recorded in the field logbook and located and numbered on the field site map. The samples will be collected from the stream bank at water level and/or at the center of the stream. If wading is required to collect the samples, sampling locations will be approached from the downstream direction.

Once this sampling site has been determined and recorded, a discrete VOC sample and a composite non-VOC sample of the streambed sediments at the sampling location will be collected . The VOC samples will be discrete samples from the depositional area collected using three EnCore™ samplers. Preservation of the VOC samples will occur at the laboratory as indicated in Section 5.7.1.1. The non-VOC sample will be collected using a clean, stainless steel spoon or spatula. The non-VOC sample will then be placed in a stainless steel mixing bowl.

The sediment will then be gently mixed and quartered. The sample will then be carefully placed in laboratory supplied sample jars using the stainless steel spoon to obtain a spoonful of sample from each quarter in succession until all of the sample jars are completely full or no more sample is available.

5.8 Borehole Abandonment Procedures

When sampling in each HSA-drilled borehole is completed, the borehole will be abandoned by pumping a bentonite slurry through the augers using the tremie pipe method. The bentonite slurry will be comprised of 94 pounds (lbs) of Portland Cement, 5 lbs of powdered bentonite and 8.3 gallons of potable water. The bentonite slurry will be mixed at the surface using a mixing vessel (clean 55 gallon drum), and a gasoline engine trash pump. The trash pump will be used in conjunction with flexible hose and one inch diameter PVC tremie pipe to emplace the grout. The lower 2 feet of the tremie pipe will be slotted, with openings at least ½ inch wide, to prevent potential blockages of flow. After thorough mixing has been completed, the bentonite slurry will be emplaced through the augers from the bottom of the borehole to the top of the borehole. The augers will then be removed. Because the augers occupy some of the borehole volume, extra bentonite slurry will be emplaced to compensate for the volume. Abandonment of each borehole with the augers still in place will be necessary to prevent borehole collapse. Immediately after each borehole is abandoned, the augers will be steam cleaned to remove grout coating the inside to prevent it from curing within the augers.

5.9 SWMU Soil Sampling Activities

Soil sampling activities will be performed across the site specific to each SWMU Grouping and AOC. The soil sampling activities for each of the SWMU Groupings and AOCs are provided in the following sections.

5.9.1 SWMU Group A

SWMU Group A consists of the following SWMUs:

- SWMU #1 - Surface Impoundment 1;
- SWMU #2 - Surface Impoundment 2;
- SWMU #3 - Surface Impoundment 3;
- SWMU #8 - Surface Impoundment 9 and Wet Well; and,
- SWMU #16 - Temporary Waste Pile Area.

These SWMUs are grouped together due to the inclusion of the SWMUs within a larger SWMU (i.e., SWMU #16 is the SWMU which encompasses the perimeter of the other SWMUs).

These SWMUs are closed surface impoundments which were used to hold waste during their operation. These surface impoundments were closed by fixing the waste and placing clean clay fill over the fixed waste. The temporary waste pile was placed over this area during the construction of the TSCA closure cell. This area was excavated to the depth of the original surface impoundments when the temporary waste pile was moved into the TSCA closure cell.

Surface Impoundments 1, 2, 3, 9 and the waste pile contained waste oils, oily sludges, inorganic acids and pickle liquors; and fixed sludges, structures and soils, respectively. PCBs, D004-D011 metals, VOCs, PAHs and phenols are the potential waste constituents that have been identified as part of this SWMU Group. Based on the historical usage and the above potential constituents, samples will be collected to characterize the impact to the soil. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI. Since the fixed waste is still emplaced in these SWMUs the following sampling protocol is proposed.

Based on the above, soil samples will be collected from 24 locations based on a systematic sampling grid based on 150-foot centers. Additionally, ten soil samples will be collected at selected locations corresponding to the former locations of the surface impoundments which were located using facility records. The soil samples collected at the grid node locations will be collected using the soil sampling procedures outlined in Section 5.7.1.1. The soil samples collected at the selected locations will be collected using the soil sampling procedures outlined in Section 5.7.1.2. 34 soil samples will be collected for this group. Figure 5-7 presents the proposed soil sampling locations in SWMU Group A.

Soil samples sent for laboratory analysis will be analyzed for the project target parameters described in Section 1.4.2 of the QAPjP. The list of compounds is included in Tables 1-2 through 1-8 in the QAPjP.

All boreholes will be abandoned upon completion within a 12-hour time period. All Investigation Derived Waste (IDW) accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.9.2 SWMU Group B

SWMU Group B consists of the following SWMUs:

- SWMU #4 - Surface Impoundment 4;
- SWMU #5 - Surface Impoundment 5;
- SWMU #7 - Surface Impoundment 7;
- SWMU #10 - Surface Impoundment 11;
- SWMU #11 - Surface Impoundment 12;
- SWMU #17 - Leachate Retention Pond; and,
- SWMU #53 - TSCA Closure Cell.

These SWMUs are grouped together due to their clean-closed status and proximity of the TSCA closure cell being emplaced over the location of former Surface Impoundments 4, 5, and 7.

Surface Impoundments 4, 5, 7, 11 and 12 contained waste oils, oily sludges, waste acids, caustics, pickle liquors and phenols. The leachate retention pond (SWMU #17) contained surface water runoff from the waste pile. The TSCA closure cell (SWMU #53) was built over the area where Surface Impoundments 4, 5, and 7 were located. PCBs, D004-D011 metals, VOCs, PAHs, dioxins and phenols are the potential waste constituents that have been identified as part of this SWMU Group.

Based on historical records and the above potential constituents, a water sample will be collected from the capillary drain that underlies the closure cell. Water from this drain is groundwater that has been in contact with surrounding soils, and this sampling approach provides a mechanism to assess the soils without disturbing the integrity of the closure cell. Sampling and analysis of this water sample will be performed as part of the Phase I RFI groundwater sampling activity, and are described in Section 5.11 of the Work Plan. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI .

Surface Impoundments 4, 5, 7, 11, and 12 (SWMUs #4, #5, #7, #10 and #12) were certified clean-closed by the facility and approved by the OEPA. The letters of certification approval from the approving agency for each of these clean closures are provided in Appendix A of this Phase I RFI WP. Results of soil sampling activities can be found in the closure certification documents for each of the units. A description of the soil conditions around each of the closed units is also provided in the certification documents. Data collected for the closure of SWMUs #4, #5, #7, #10, and #11 will be submitted in the Phase I RFI Report.

5.9.3 SWMU Group C

SWMU Group C consists of the following SWMUs:

- SWMU #6 - Surface Impoundments 6E and 6W;
- SWMU #9 - Surface Impoundment 10; and,
- SWMU #19 - Former Drum Storage Area.

These SWMUs are grouped together due to the location and overlapping of the units. The former surface impoundments identified in this grouping were at one time associated with each other as identified in the facility's operational record. SWMU #19, the former drum storage area is located above or adjacent to the surface impoundments in the area and therefore has been included in this grouping.

Surface Impoundment 6 contained waste acids, acid sludges, pickle liquors, phenol wastes and sludges from Surface Impoundment 9. Surface Impoundment 10 contained aqueous sludges and phenols wastes. The history of the old drum storage pad is uncertain. PCBs, pesticides, D004-D011 metals, VOCs, PAHs, and phenols are the potential waste constituents that have been identified as part of this SWMU Group. Based on historical records and the above potential constituents, samples will be collected to characterize the impact to the soil, if any. Monitoring well MW-20R is located downgradient of the SWMUs in this group. Recent historical data generated as part of the RCRA and TSCA monitoring programs will be validated in the Phase I RFI to assess the groundwater quality around this SWMU group. A groundwater sample will be collected to support this validation. Further characterization of the groundwater will be completed as part of the Phase II RFI, if appropriate. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

These SWMUs are closed surface impoundments which used to hold waste during their operation. These surface impoundments were closed by fixing the waste and placing clean clay fill over the fixed waste. The former drum storage area was placed above these two surface impoundments after closure. The fixed waste from these two surface impoundments is still emplaced. Since the fixed waste is still emplaced the following sampling protocol is proposed.

Soil samples will be collected from locations based on a systematic sampling grid based on 100-foot centers. Additionally, soil samples will be collected at five selected locations within the former locations of the surface impoundments and the drum storage pad. The location of these former units are estimated using information obtained from the facility records. The soil samples collected at the grid node locations will be collected using the soil sampling procedures outlined in Section 5.7.1.1. The soil samples collected at the select locations will be collected using the soil sampling procedures outlined in Section 5.7.1.2. Based on the above sampling protocol, 23 soil samples will be collected in this SWMU Group. The proposed soil sampling locations in SWMU Group C are presented in Figure 5-8.

Soil samples sent for laboratory analysis will be analyzed for the project target parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 in the QAPjP.

All boreholes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.9.4 SWMU Group D

SWMU Group D consists of the following SWMUs:

- SWMU #12 - North Landfarm;
- SWMU #13 - East Landfarm; and
- SWMU #14 - South Landfarm.

These SWMUs are grouped together due to the similar manner in which they were utilized during their operation. It is documented in the facility's operation record that several feet of clay is estimated to have been placed over these excavated areas and the areas were graded to promote runoff of surface water.

The North, East and South Landfarms contained oily and plating sludges. In addition the waste history of the landfarms indicated that metal hydroxide sludges were present at the North and East Landfarms, but absent at the South Landfarm. PCBs, D004-D011 metals, VOCs, PAHs and phenols are the potential waste constituents that have been identified as part of this SWMU Group. Based on historical record and the above potential constituents, samples will be collected to confirm the removal of residual wastes. Soil sampling will also support the groundwater assessment . If soil sample results indicate the need for the additional assessment of groundwater, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

The landfarms received sludges from the surface impoundments. These areas were closed by removing soils and backfilling with clean soils from an offsite source and capped with clay. The following soil sampling protocol will be used to confirm the removal of residual wastes in these areas.

Thirty-three soil samples will be collected from locations based on a systematic sampling grid based on 100-foot centers. The soil sampling locations are proposed to characterize the soil conditions in SWMU Group D. The proposed soil sampling locations for SWMU Group D are presented in Figure 5-9.

The soil samples will be collected in a similar manner as outlined in Section 5.7.1.1. Samples will be collected at a depth of approximately 2.5 to 4.5 feet. The sampling depth is based on the approximate "tilled" depth used during the operation of the units.

Soil samples sent for laboratory analysis will be analyzed for the project target parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 in the QAPjP.

All boreholes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.9.5 <u>SWMU Group E</u>

SWMU Group E consists of the following SWMUs:

- SWMU #50 - Injection Well 1A;
- SWMU #51 - Injection Well 1; and
- SWMU #52 - Injection Well 3.

These SWMUs are grouped together due to the similar manner in which they were utilized during their operation. These units were all decommissioned due to casing failures at depths greater than 2,000 feet bgs. These casing failures may have leaked the diesel fluid used in the annulus of the injection well, or waste into the adjacent rock. Acids, D004-D011 metals, and VOCs are the potential waste constituents that have been identified as part of this SWMU Group. Based on the historical records and the above potential constituents, samples will be collected to determine whether contamination exists in the surficial soils. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for the additional assessment of groundwater, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

One surface soil sample will be collected around each of the SWMUs in the approximate area where the SWMU was located. Figure 5-10 presents the proposed soil sampling locations in SWMU Group E. The sampling objective of this group of SWMUs is to determine if there is any indication of surface spills from past operation of these SWMUs. The soil will be collected using the surface sampling procedures described in Section 5.7.2.

The soil will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 in the QAPjP.

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sample hole will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed at the abandoned hole so an accurate surveyed location can be recorded.

5.9.6 SWMU Group F

SWMU Group F consists of following SWMUs:

- SWMU #31 - Filtered Acid Tank (FAT) 3;
- SWMU #32 - Pumphouse 3;

- SWMU #33 - FAT 6;
- SWMU #34 - Pumphouse 6;
- SWMU #35 - FAT 5;
- SWMU #36 - Pumphouse 5;
- SWMU #37 - FAT 4;
- SWMU #38 - Pumphouse 4;
- SWMU #39 - Old FAT 2; and,
- SWMU #40 - Former Pumphouse 2.

The filtered acid tanks and pump houses contain filtered acidic wastes. Acids, D004-D011 metals, phenols and VOCs are the potential waste constituents that have been identified as part of this SWMU Group. Based on historical records and the above potential constituents, soil samples will be collected at selected locations to determine whether contamination exists in the surficial soils. Soil sampling will also support the groundwater assessment. If soil samples indicate the need for the additional assessment of groundwater, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

These SWMUs are grouped together due to the similar manner in which they were utilized during operation. Presently all of the FATs have a reinforced concrete secondary containment system in place to contain any leaks or spills. These secondary containment systems were constructed in the mid-1980s. There are reports of some spills in the historical record around FAT 3 in which approximately 2,000 gallons of acid were released due to mechanical failure. The areas around spills were immediately remediated upon knowledge of their occurrence.

In order to determine whether contamination exists in the surficial soils, soil samples will be collected around each of the SWMUs or biased to a location where contamination may have existed. The surface soil samples will be collected using the procedures described in Section 5.7.2. The intent of this soil sampling is to document if any contamination exists due to the past operation of the units. The proposed soil sampling locations for SWMU Group F are presented in Figure 5-11. A total of 20 surface soil samples will be collected as part of this grouping.

Soil samples collected within these SWMUs will be analyzed for the project parameters as described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP.

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling hole will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

5.9.7 SWMU Group G

SWMU Group G consists of the following SWMUs:

- SWMU #21 - Truck Unloading Building;
- SWMU #22 - Sand Interceptors;
- SWMU #23 - V-Tanks;
- SWMU #24 - Caustic Gas Scrubber;
- SWMU #25 - T-Tanks;
- SWMU #26 - T-Tank Pump House;
- SWMU #27 - Leaf Filter Press Building;
- SWMU #29 - Filter Press Building; and,
- SWMU #30 - Fat A and B.

These SWMUs are grouped together based on their active status within the treatment process. These SWMUs handle pickle liquors, acids, and brines. Acids, D004-D011 metals and VOCs are the potential waste constituents that have been identified within this SWMU Group. Based on the historical record and the above potential constituents, samples will be collected at selected locations to characterize the impact to soil, if any. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

Small quantity releases have been documented from some of the above SWMUs in the facility's operational record. Upon the knowledge of their occurrence these spills were remediated. Soil samples will be collected in areas biased towards spill potential. Figure 5-12 presents the proposed soil sampling locations for SWMU Group G. A description of the soil sampling proposed for each of the SWMUs is provided below:

SWMU #21 - Truck Unloading Building:

No releases have ever been reported and spill resistant liners are used in each sump. The concrete floors are sloped to these 18-inch deep sumps. No sampling is proposed at this SWMU.

SWMU #22 - Sand Interceptors (Grit Filters):

The Grit filters are contained in concrete chambers which serve as secondary containment. No releases to the soil or groundwater are documented. No sampling is proposed at this SWMU.

SWMU #23 - V-Tanks:

Four soil samples will be collected in locations biased near the transfer lines leading to the V-Tank facility. The soil samples will be collected at just below the depth of the concrete vault, which is approximately 13 feet below ground surface. The soil samples will be collected in a similar manner as outlined in Section 5.7.1.2. Prior to sampling, boreholes will be advanced to 10 feet. Then, continuous cores will be obtained until borehole termination as described in Section 5.7.1.2. Soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP.

All boreholes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

SWMU #24 - Caustic Gas Scrubber

Air releases from the scrubber have been documented. However, changes in the management of certain waste streams have been implemented to prevent further releases from occurring. No sampling is proposed at this SWMU.

SWMU #25 - T-Tanks

This unit was constructed in 1989 with secondary containment. No releases have been associated with this unit. No sampling is proposed at this SWMU.

SWMU #26 - T-Tank Pump House

This unit was constructed in 1989 and all pumps are housed within a building on a bermed concrete pad. No releases have been associated with this unit. No sampling is proposed at this SWMU.

SWMU # 27 - Leaf Filter Press Building:

Surface soil sampling will be conducted in areas with potential contamination. Three surface soil samples will be collected around the building according to the procedures described in 5.7.2. Soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP.

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling holes will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

SWMU # 29 - Plate Filter Press Building:

Surface soil sampling will be conducted in areas near the former underground pipes which led to the sluice pit. All soils associated with these pipes are reported to have been removed; however soil samples will be collected to verify previous Interim Corrective Measure activities. Four soil samples will be collected around the building. The soil samples will be collected using the procedures outlined in Section 5.7.2. Soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP.

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling hole will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

SWMU # 30 - FAT A & B:

Surface soil samples will be collected in areas with a potential for contamination and outside the containment berm. Three surface soil samples are proposed, one at each accessible direction around the containment. Surface soil samples will be collected using the procedures outlined in Section 5.7.2. Soil samples collected within this SWMU will be analyzed for the project parameters listed in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP.

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling hole will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

5.9.8 SWMU Group H

SWMU Group H consists of the following SWMUs:

- SWMU #46 - Injection Well 2;
- SWMU #47 - Injection Well 4;
- SWMU #48 - Injection Well 5; and,
- SWMU #49 - Injection Well 6.

The injection wells that comprise this SWMU group are used to inject filtered acid wastes and brines into the Mt. Simon Sandstone at depths greater than 2,000 feet below ground surface. Acids, D004-D011 metals, and VOCs are the potential waste constituents that have been identified as part of this SWMU Group. Based on the historical record and the above potential constituents, samples will be collected at selected locations to characterize the impact to soil, if any. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

Surface soil samples will be collected around each injection well to determine whether surface spills have occurred and impacted surface soils around the SWMUs. Figure 5-13 presents the proposed soil sampling locations for SWMU Group H. The soil samples will be located in areas with the potential for contamination. One surface soil sample will be collected at each of the injection wells. Surface soil samples will be collected using the procedures outlined in Section 5.7.2. Soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP. If PCBs are found during this analysis, the soil samples will also be analyzed for dioxins and furans (Table 1-8 of the QAPjP).

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling hole will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

5.9.9 SWMU Group I

SWMU Group I consists of the following SWMUs:

- SWMU #15 - Oil Recovery Area;
- SWMU #18 - Former W-Tanks;
- SWMU #20 - Lab Waste Tank;
- SWMU #28 - Sluice Pit;
- SWMU #41 - PCB Storage Area;
- SWMU #42 - Maintenance Waste Oil Tank (Closed);
- SWMU #43 - Sanitary Wastewater Treatment Facility;
- SWMU #44 - Truck Unloading Facility Cesspit; and,
- SWMU #45 - Maintenance Building Cesspit.

The above grouping of SWMUs are considered to be independent of each other. Therefore, these SWMUs will be described individually, with separate sampling and analytical procedures as presented in the following sections.

5.9.9.1 SWMU #15 - Oil Recovery Area

The oil recovery area was used to recover oil bearing wastewaters and light oil sludges which were mixed and sent to an oil/water separator. The recovered oil was stored in tanks. Cyanide, PCBs, D004-D011 metals, PAHs and VOCs are the potential waste constituents that have been identified as part of this SWMU. The wastewater was transferred to a pretreatment system prior to disposal in the injection wells. The decommissioning of the facility was completed in 1985. The contents of the oil recovery area was either placed in the temporary waste pile or sent offsite for disposal. PCBs were discovered throughout the oil recovery area and soils were removed. Soil sampling determined that no other contamination existed. Twelve soil samples will be collected within the area of this SWMU using a systematic grid based on 100-foot centers. The proposed soil sampling locations in SWMU #15 are presented in Figure 5-14.

The sampling proposed for this SWMU is based on the fact that remediation activities have been performed and that the soil sampling conducted within this SWMU is with the intent of confirming the remediation activities. The remediation efforts involved the excavation of grossly contaminated soils. However, there remains a possibility that some residual contamination still may exist. If residual contamination does indeed exist in this area, then the most likely location for this is the fill/in-situ soil interface. Soils collected during this phase of sampling will be collected in order to determine if the remediation of soils was adequate. It is also anticipated, due to the well documented geologic and hydrogeologic characteristics of the glacial soils at the site, that the migration of contaminants below 2 feet is highly unlikely (i.e., lacustrine soils with high clay content exist). Subsurface soil samples will be collected in a similar manner as outlined in Section 5.7.1.1 from a depth of 2 to 4 feet bgs. Soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP. If PCBs are found during this analysis, the soil samples will also be analyzed for dioxins and furans (Table 1-8 of the QAPjP). Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

All boreholes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.9.9.2 SWMU #18 - Former W-Tanks

The Former W-Tanks were clean closed in 1992. Prior to that they had been used to store aqueous wastes, oily wastes, odorous wastes and phenolic waste prior to treatment. During the clean closure of the unit, samples were collected to characterize the soils.

Soils data from the clean closure will be submitted in the Phase I RFI report. No sampling is proposed at this SWMU.

5.9.9.3 SWMU #20 - Lab Waste Tank

The lab waste tank is a 2,500 gallon capacity polyethylene underground storage tank (UST) which receives lab wastes and unused portions of samples taken from tanker trucks. The tank is regularly pumped out for deep well injection. This tank sits in a concrete vault measuring 9 feet wide by 9 feet long by 9 feet deep. The concrete is 8 inches thick along the walls and the base. The lab waste tank is active and used to store unused tanker samples and lab wastes prior to disposal. No F-solvents are stored in this tank. PCBs, PAHs, D004-D001 metals, phenols and VOCs are the potential waste constituents that have been identified as part of this SWMU. Based on the historical record and the above potential constituents, a sample will be collected to determine whether there has been a release to the soils. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

One soil sample will be collected just below the base of the concrete vault at an approximate depth of ten feet bgs in the downgradient direction of groundwater flow within the lacustrine soils to determine whether there have been releases. Soil sampling location may have to modified in the field due to the proximity of other structures in the area of this SWMU. The proposed soil sampling location for SWMU #20 is presented in Figure 5-15. The soil sample will be collected in a similar manner as outlined in Section 5.7.1.2. Prior to sampling the borehole will be advanced to a depth of 7 feet. Then continuous cores will be collected until borehole termination as described in Section 5.7.1.2.

Soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP.

All boreholes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.9.9.4 SWMU #28 - Sluice Pit

The Sluice Pit was clean closed in 1996. This unit held acidic rinse water derived from the backflushing of the leaf filters. During the clean closure of the unit, samples were collected to characterize the soils.

Soils data from the clean closure will be submitted in the Phase I RFI report. No sampling is proposed at this SWMU.

5.9.9.5 SWMU #41 - PCB Storage Area

The drum storage pad is active and used as a 90 day storage area. Drums of filters, filtered materials and solids are staged in this area to await shipment to the off-site disposal facility. Various acids, D004-D011 metals, phenols and VOCs are the potential waste constituents that have been identified as part of this SWMU. Based on the historical record and the above potential constituents, samples will be collected to characterize the impact to the surface soils, if any. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

Three surface soil samples will be collected within the SWMU in the direction of surface water run-off. The surface soil sample will be collected using the procedures outlined in Section 5.7.2. The proposed soil sampling locations for SWMU #41 are presented in Figure 5-17. Soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-4 and Table 1-7 of the QAPjP.

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling holes will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

5.9.9.6 SWMU #42 - Maintenance Waste Oil Tank (Closed)

The waste oil lube tank has been closed and removed. While in service, the waste oil lube tank received waste lube oil derived from the on-site machinery. VOCs, SVOCs and TPH are the potential waste constituents that have been identified as part of this SWMU. Based on the historical record and the above potential constituents, samples will be collected. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

Two soil samples will be collected from this location to determine whether residual contamination remains in this area. This SWMU was removed in 1992, however no documentation exists on the characterization of the soil under the location of the tank. One soil sample will be collected at the lowest surface elevation in the area of the former tank, and another soil sample will be collected at a depth between 2 - 4 feet below the ground surface. The proposed soil sampling locations for SWMU #42 are presented in Figure 5-18. Soil samples will be collected in a similar manner as outlined in Section 5.7.1.2 except that only two samples will be collected. Both soil samples collected within this SWMU will be analyzed for VOCs, SVOCs, PCBs, and metals.

All boreholes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.9.9.7 SWMU #43 - Sanitary Wastewater Treatment Facility

The wastewater treatment plant treats septic wastes pumped out of the cesspits located at the maintenance building and the truck unloading facility. Septic waste is the constituent that has been identified as part of this SWMU. Based on the historical record and the above potential constituents, samples will be collected to characterize the impact to the surface soils, if any. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

Two soil samples will be collected beneath the base of the two series of vaults in the downgradient direction of groundwater flow in the lacustrine soils. Figure 5-19 presents the proposed soil sampling location for SWMU #43. Subsurface soil will be collected in a similar manner as outlined in Section 5.7.1.2. The soil samples collected within this SWMU will be sent to the laboratory for the analysis of VOCs, SVOCs, metals and chloride in the soil at the base of the vault. The chloride analysis will be used as an indicator to determine whether the sanitary wastewater treatment facility has leaked.

All boreholes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.9.9.8 SWMU #44 and 45 - Truck Unloading Facility and Maintenance Building Cesspits

These cesspits are located at the maintenance building and the truck unloading facility. Septic waste is the constituent that has been identified as part of this SWMU. Based on the historical record and the above potential constituent, samples will be collected. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

One soil sample will be collected from a depth below the base of the Maintenance Building Cesspit and the Truck Unloading Building Cesspit. The proposed soil sampling locations for SWMU #44 and #45 are presented in Figure 5-20. Subsurface soil will be collected in a similar manner as outlined in Section 5.7.1.2. The soil samples collected from within SWMU #44 and #45 will be sent to the laboratory for the analysis of VOCs, SVOCs, chloride and metals within the soil at the base of the pits. The chloride analysis will be used as an indicator to determine whether the cesspits have leaked.

All boreholes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The borehole will then be abandoned as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.10 AOC Soil Sampling Activities

5.10.1 AOC A - Maintenance Tanks

There are 26 empty emergency tanks located across the facility along the above ground transfer piping. These tanks are between 500 - 1,000 gallons in capacity and in some places they are housed in concrete vaults. The tanks are used to store filtered acidic waste when the transfer piping needs to be drained in times of emergency power outages or repairs. According to the facility's operational record, none of these tanks have had a release and some have never been used. Acids, D004-D011 metals, and VOCs are the potential waste constituents that may be associated with this AOC. In order to characterize these tanks a total of 18 samples will be collected from the surface soil around the tanks. Some of the tanks are positioned in groups of two or three, so in these locations a single sample will characterize more than one tank. Surface soil samples will be collected using the procedures outlined in Section 5.7.2. Surface soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables

1-2 through 1-7 of the QAPjP. The locations of the transfer pipeline maintenance tanks are presented in Figure 5-21. The soil sample locations are presented in Figure 5-26. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI to recommend an appropriate CMS, if necessary.

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling holes will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

5.10.2 AOC B - North Parking Lot - Truck Unloading Facility

This area was identified as an AOC during the RFA Visual Site Investigation performed by Jacobs Engineering. They identified seven roll-off boxes located on the soil south of the 90-day Drum Storage Pad. In addition, approximately 100 small drums were found on the pavement at the northwest corner of the parking lot. Acids, D004-D011 metals, PCBs, and VOCs are the potential waste constituents associated with this AOC. In order to characterize this AOC, two surface soil samples will be collected in the two areas identified above: the soil south of the 90-day Drum Storage Pad; and on the grassy area in the northwest corner of the parking lot. The sampling locations are based on surface drainage patterns. The approximate areas of concern and the proposed soil sampling locations in AOC B are presented in Figure 5-22. The surface soil samples will be collected using the procedures outlined in Section 5.7.2. Soil samples collected within this SWMU will be analyzed for the project parameters listed in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

All sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling holes will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

5.10.3 AOC C - Pug Mill Staging Area (Hay Mill)

The Hay Mill area consists of concrete foundations from a farm house and silos, and is located west of Injection Well 5. This area was identified due to the Pug Mill or sludge fixing equipment stored at this location. The Pug Mill is documented within the facility's operation record as being decontaminated. The Pug Mill was used to solidify and fix sludges. In order to characterize this AOC one surface soil sample will be collected under the stored equipment. This sample will be collected at the most potentially contaminated location. The proposed soil sampling location in AOC C is presented in Figure 5-23. The surface soil sample will be collected using the procedures outlined in Section 5.7.2. The soil sample collected within this SWMU will be analyzed for the project parameters listed in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed on Tables 1-2 through 1-7 of the QAPjP. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

The sampling hole will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling hole will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

5.10.4 AOC D - Borrow Pit #1

Borrow Pit #1 was located to the west of former Surface Impoundment 12 (SWMU #11). It was created as a borrow pit for soils to be used to increase the height of the dikes for Surface Impoundments 11 and 12 (SWMUs #10 and #11). This area was identified due to the previous demolition debris staging area on the north side of the pit. The entire area has been part of the clean closure of Surface Impoundments 11 and 12. Soil samples were collected as part of this interim remedial activity. The OEPA approved the " clean-closure" of Surface Impoundments 11 and 12. No sampling is proposed at this AOC. Data collected for the closure of Surface Impoundments 11 and 12 (SWMUs #10 and #11), which includes soil sampling from AOC D, will be submitted in the Phase I RFI Report.

5.10.5 AOC E - Borrow Pit #2

Borrow Pit #2 was initially excavated to provide clay and fill material for the closure of Surface Impoundments 4, 5 and 7 in 1985. Clay and fill material from the pit was used for the closure of several other areas as the need for fill continued across the site. The pit was enlarged further when clay was used for the capping of the TSCA Closure Cell. After the remedial activities were completed, Borrow Pit #2 was allowed to fill with surface water run-off and is now used as a wildlife habitat. Surface water entering this area is from the large field south of Borrow Pit #2 and west of the main facility operations area. Flow control gates from the surface water management system prevent releases of waste from entering the borrow pit area. No sampling is proposed at this AOC.

5.10.6 AOC F - Truck Sampling Area, Inspection Bay Collection Tank, and Old Truck Scale

This AOC consists of the active truck sampling area, the active scale and receiving trailer, the inactive (old) truck scale, and an underground storage tank which is housed within a concrete vault. The vault is used to collect rain and snowmelt from under the active covered truck sampling area. The rain and snowmelt collected under the active scale is diverted to the ditching system. Various acids, D004-D011 metals, phenols and VOCs are potential waste constituents in these areas. Based on the historical record and the above potential constituents, one surface soil sample will be collected at the location where run-off from the active scale is diverted to the surface drainage ditch system. An additional surface soil sample will be collected on the entrance side of the inactive truck scale. These samples will be collected at the most potentially contaminated locations. The proposed soil sampling locations for AOC F are presented in Figure 5-24. The surface soil samples will be collected using the procedures outlined in Section 5.7.2. The soil samples collected within this SWMU will be analyzed for the project parameters listed in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP.

Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

The sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling holes will then be abandoned as described in Section 5.7.2. Survey stakes marked with unique identification numbers will be placed in the abandoned holes so accurate surveyed locations can be recorded.

5.10.7 AOC G - Roll-Off Staging Pad

This AOC consists of the area where roll-off containers which contain sludge from the filter press building are staged. These roll-offs are removed for off-site disposal. The roll-off pad was built in 1991 with concrete berms to surround the pad. No known releases are documented to have occurred around the roll-off pad. No sampling is proposed at this AOC.

5.10.8 AOC H - Facility Aboveground Transfer Piping

Aboveground transfer piping exists across the entire facility. This piping transfers wastes from the T-Tanks to each of the injection wells, through each of the FATs. Acids, D004-D011 metals, phenols and VOCs are potential waste constituents in this AOC. Eight releases have been documented to have occurred along the aboveground transfer piping since 1993. All of these releases were remediated after their occurrences. These incidents are presented on Figure 5-25.

To assess these historic spills, surface soil samples will be collected as described in Section 5.7.2 under the above ground piping at six of these release areas as presented on Figure 5-26. The releases for Incident #15 and #600 are covered by surface soil sampling being performed at SWMU #23 (SWMU Group G) as described in Section 5.9.6 above. Therefore, no additional sampling is proposed as part of AOC H. In addition, eight sediment samples will be collected in Meyers Ditch between the plant entrance and the flow control gate at Little Raccoon Creek and three sediment samples will be collected in Little Raccoon Creek.

The sediment sampling locations in Meyers Ditch are shown in Figure 5-26. The sediment sampling locations in Little Raccoon Creek will be as follows: one sample about 50 feet upstream of the confluence with Meyers Ditch; one sample about ⅜ mile downstream of the confluence (first east-west road); and one sample about 1⅛ miles downstream of the confluence (first north-south road). The sediment sample locations described above are subject to approval of the land owners adjacent to these water bodies. If land owners adjacent to these locations do not allow access, alternative locations will be sampled. Sediment samples will be collected using the procedures outlined in Section 5.7.3.

Soil and sediment samples collected within this AOC will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

All soil sampling holes will be abandoned upon completion within a 12-hour time period. All IDW accumulated during drilling will be containerized, handled and disposed in accordance with all applicable regulations. All IDW will be handled as described in Section 5.5.3. The sampling holes will then be abandoned as described in Section 5.7.2. A survey stake marked with a unique identification number will be placed in the abandoned hole so an accurate surveyed location can be recorded.

5.10.9 AOC I - Remaining Underground Piping

A review of the facility records document underground piping located across the facility at an approximate depth of 4 feet bgs. Most of this piping, if not all, is believed to have been removed. In order to document that the underground piping has been removed, a search of facility records which document locations of underground piping will be completed and a pilot test Using Ground Penetrating Radar (GPR) will be conducted. This pilot test will be completed in an area where underground piping is known to exist. This pilot test will be complete in order to determine if the natural soils (clays) have a masking affect on the return echos from the test.

The GPR pilot test area will be west of the truck unloading facility where an abandoned underground pipeline is known to exist. The test area will be set up using an equally spaced grid. Geophysical Survey Systems, Inc. will be retained to conduct the pilot test. Test pits will be excavated to provide a source characterization in the areas where evidence of underground piping exists or once existed, if the GPR does not provide the needed data. The test pits will be completed to a depth of 6 feet bgs. This will allow for sampling and direct visual characterization of any residual wastes which may be present and assessment of the condition of the underground piping. The locations of possible underground piping on the site are presented on Figure 5-27. If residual waste is encountered without piping, samples will be collected from the residual waste and the soils below.

The tests pits will be excavated with a standard backhoe. The final orientations and dimensions of test pits will be determined in the field based on observed conditions. Minimum test pit dimensions will be approximately 12 feet x 4 feet x 6 feet (length x width x depth).

Two grab soil samples will be collected from each of the test pits which uncover buried lines. One soil sample will be collected on the walls of the test pit and another one at 2 feet below the uncovered underground piping. For sample parameters other than VOCs, the grab samples will be composited in a stainless steel mixing bowl. The soil will be mixed with a stainless steel spoon or spatula until the soil sample is as homogeneous as possible. The sample will then be quartered and the appropriate sample jars will be filled. A discrete VOC sample will be collected from each test pit prior to collecting samples for the other parameters. Soil samples collected within this SWMU will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPjP. Soil sampling will also support the groundwater assessment. If soil sample results indicate the need for additional groundwater assessment, further characterization of the groundwater will be completed as part of the Phase II RFI. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

5.10.10 AOC J - Area Around Monitoring Well L-19

The area around monitoring well L-19 has had an historical presence of 1,2-dichloroethane in the groundwater within the well. This contaminant, however, has not migrated from this location. Investigations have been completed to document and determine the extent of this contaminant.

Historical sampling data will be validated and submitted in the Phase I RFI. No sampling is proposed at this AOC

5.11 Phase I RFI Groundwater Sampling

During the Phase I RFI, preliminary characterization of groundwater in the lacustrine sediments and bedrock downgradient of land-based SWMUs and AOCs that still contain residual waste materials will be completed by validation of analytical results from the three most-recent rounds of historical data, and the collection of groundwater samples from the following on-site groundwater monitoring wells:

- L17 lacustrine sediments downgradient of SWMU Group A;
- L19A lacustrine sediments downgradient of SWMU Group C;
- L20 lacustrine sediments downgradient of SWMU Group C;
- L25 lacustrine sediments downgradient of SWMU Group A;
- L26 lacustrine sediments upgradient;
- MW-14R bedrock downgradient of SWMU Group A;
- MW-15R bedrock downgradient of SWMU Group A;
- MW-20R bedrock downgradient of SWMU Group C;
- MW-22R bedrock downgradient of SWMU Group C; and,
- MW-24R bedrock upgradient.

The locations of these wells are shown in Figure 5-28.

Groundwater samples will be collected using the sampling procedures described in the facility Groundwater Sampling and Analysis (GWSA) Plan for the Part B Permit (Appendix D). The order of sampling will be the same as described in the GWSA Plan. Based on past groundwater sampling activities, total and dissolved metals will be collected and analyzed due to the background groundwater quality in the vicinity of the CWM Vickery Facility. Dissolved metals will be collected by filtering the water in the same manner described in the GWSA Plan.

As part of the Phase I RFI groundwater sampling activity, a water sample will be collected from the capillary drain that underlies the TSCA Closure Cell. The intent of collecting this aqueous sample is that the water collected from the capillary drain is groundwater derived from soils that underlie SWMU Group B.

The samples from the capillary drain will be collected through the capillary drain piping system which discharges into a sump. The sump is located centrally on the north side of the TSCA Closure Cell. There are two pipes, one running west to east to the sump and one running east to west to the sump. Volatile organic samples will be filled directly from the two pipes. The other sample bottles will be filled by collecting the sample in a beaker and then pouring the contents into the sample bottles.

The groundwater samples will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Tables 1-2 through 1-8 of the QAPjP.

5.12 Background Soil Sampling

Background data for metals concentrations in Facility soils will be obtained through analysis of samples collected in areas of the property that have not been used for waste management purposes. Soil samples will be collected at the ground surface and a depth of 8 to 10 feet bgs at five locations.

Soil samples will be collected in a similar manner as outlined in Section 5.7.1.1. Soil samples collected to establish background metals concentrations will be analyzed for the project parameters described in Section 1.4.2 of the QAPjP. The compounds are summarized in Table 1-1 and listed in Table 1-7 of the QAPjP. All data collected will be used to support a quantitative risk assessment at the completion of the Phase II RFI.

All boreholes will be abandoned upon completion within a 12-hour time period, as described in Section 5.8. A survey stake marked with a unique identification number will be placed in the abandoned borehole so an accurate surveyed location can be recorded.

SECTION 6
DATA MANAGEMENT PLAN

Data management involves maintaining and controlling all data related to this project. The data for this project will come from three sources (1) field data, (2) laboratory data and (3) administrative data. Field data includes items such as field notes and logbooks, soil boring logs, field sampling measurements (pH, temperature, conductivity, etc.,) visual observations, and field equipment calibrations. Laboratory data typically includes all information obtained by the laboratory during analysis of the samples. Administrative data includes internal and external correspondence, meeting minutes, telephone conversation logs, plans and schedules, reporting and auditing procedures, engineering, calculations and contract documents. All data will be maintained in a project file containing the following sections:

- Administrative;
- Engineering;
- Analytical Data;
- Procurement; and,
- Drawings.

The project file will be maintained by control personnel using a documentation log for each section. All project related information will be first routed to the PM who will maintain responsibility for routing the information to the appropriate personnel.

During the field work, a temporary office will be maintained on-site. The office will have duplicate project files that may be pertinent to the field work. This office will be secured when not in use.

6.1 Data Presentation

Data should be presented in a clear and logical format. Tabular, graphical and other visual displays are essential for evaluating data. Tables and graphs are not only useful for expressing results, but are necessary for decision-making during the investigation. Other data such as sample locations coordinates are more effectively shown in graphic form. Table 6-1 contains various methods for data presentation.

6.1.1 Tables

Tabular presentations of both raw and sorted data are useful means of presentation. These are discussed in the following paragraphs.

6.1.1.1 Listed (Raw) Data

Simple lists of data alone are not adequate to illustrate trends or patterns. These lists will be presented however for sample validation and auditing. Each data record will provide at a minimum: (1) a unique sample code, (2) sampling location and sample type, (3) sampling data and time, (4) laboratory analysis identification number, (5) component measured, (6) analytical results, (7) detection limits and (8) reporting units.

Analytical data will be reduced by the laboratory before reporting. All data will be reported, including suspected outliers or samples contaminated due to improper collection, preservation or storage procedures. The rejected data will be marked as such in the tables and explanations of rejected data will be presented in footnotes.

In addition to analytical data, sampling logs will be included. Information on the logs will include at the minimum but not be limited to, the following: name and address of the sampler(s); purpose of sampling; data and time of sampling; sample type and suspected contaminants; sample location, description and coordinates (including photos); sample method, containers and preservation; sample weight or volume; number of samples taken; sample identification number(s); amount purged; field observations; field measurements; weather conditions; and the name and signature of person responsible for observations. Any unusual conditions encountered during the sampling event will be noted on the sample logs.

6.1.1.2 Sorted Summary Tables

Presentation of results grouped according to data categories is one of the simplest formats used to display trend or patterns in data. Sample data for this project will be sorted by medium, sample location and by contaminant.

6.1.1.3 Graphic Presentation of Data

Graphic methods of data presentation will often illustrate trends better than tables. Graphic formats that may be used include bar graphs, line graphs, isopleth plots, cross-sections or three-dimensional data plots.

6.1.2 Data Reduction

Data will be reported according to accepted practices of QA and data validation. All data will be reported. However, treatment of replicate measurements, identification of outliers and reporting of results determined to be below detection limits is discussed in the following paragraphs.

6.1.2.1 Treatment of Replicates

Replicate measurements of a single sample will be averaged prior to further data reduction.

6.1.2.2 Reporting of Outliers

Due to the variability of environmental sampling resulting from field conditions, some data may be outside of the expected range of values. Outlier values may result from a catastrophic occurrence such as a spill; inconsistent sampling or analytical chemistry methodology; errors in the transcription of data values or decimal points or true but extreme concentration measurements. If the cause of the outlier is known or determined to be an error in transcription and the correct values can be obtained, the affected data will be corrected and documented. If the cause of the outlier is a catastrophic event or a problem in methodology, data values will be reported with clear reference. Documentation and validation of the cause of outliers will accompany any attempt to correct or delete these data values. Outliers will not be omitted from raw data.

6.1.2.3 Reporting Values Below Detection Limits

Analytical values determined to be at or below the detection limit will be reported numerically (e.g., ≤ 0.1 mg/l). The data presentation procedures will cite analytical methods used including appropriate detection limits.

6.1.2.4 Data Deliverables and Reporting

The raw analytical results will be obtained from the laboratory. These results will be transmitted to Rust on diskette deliverables accompanied by the laboratory report packages. The raw analytical data will be sent on a 3.5" floppy diskette in an ASCII file format. The raw analytical data and laboratory report packages will be tailored to meet specific regulatory requirements as needed.

A Rust computer programmer will develop a database file identifying the data fields of the raw analytical data and import the ASCII data file in the database file. This will create a master database file with all of the raw analytical data for the sampling event. The master database file will be manipulated such that the data output will be presented to the U.S. EPA in hard copy, tabular format. An example of the hard copy tabular format is presented in Appendix A. In addition to this table, the master database file, in electronic format and the laboratory report packages will be provided to the U.S. EPA.

6.1.2.5 Data Manipulations

Once the master database has been created the data will be manipulated to perform any calculations required to allow for consistent reporting of units. If there are any inconsistencies in the spelling of parameters, the data will be modified for consistency. The sample date will also be manually modified if necessary to present the data in proper format.

Upon completion of the data validation process, the Contract Required Quantitation Limit (CRQL), Sample Quantitation Limit (SQL), Contract Required Detection Limit (CRDL), Instrument Detection Limit (IDL) and data qualifiers will be added to the master database file. Using database programs developed by a Rust computer programmer, the master database file will be manipulated to produce several smaller database files. These smaller database files will assist in the preparation of the hard copy table. If the data requires manipulation to take into consideration percent moisture or percent solids, the database programs will perform any necessary calculations to modify the results.

Once all of the validated data has been entered into the master database, the program to produce the hard copy table will be run and a draft printout of the table generated.

6.1.2.6 Quality Assurance/Quality Control Measures

As a quality assurance/quality control measure, the data presented on the hard copy table will be compared to the data from laboratory report package to assure that the data being reported is correct. Any data that was manually entered or modified in the master database will also be confirmed for accuracy.

6.1.3 Sample Identification

All samples will be identified according to the following sample numbering system:

SSS:MM:LLLL-XX-YY

where SSS is the "site" location, MM is the media samples, LLLL is the sampling "location" designation within the "site", XX is the sequence number of samples at that "locations", and YY is the QA/QC sample identifier, if any.

Examples of site locations would include "S01" for SWMU 1 and "ACH" for AOC H. Where SWMUs overlap within SWMU Groups A, B, or C, samples will be assigned to the site they best represent. Media identifiers will include "SW" for stabilized waste material, "SL" for soil (surface or subsurface), "SD" for sediment, and "GW" for groundwater. Examples of location designations within a site would include "SL01" for the first "select" soil sampling location, "GNB2" for the grid node sample in row B, column 2, and "TP04" for the fourth test pit. Location designations will be noted in the field on copies of the figures from Section 5 of the Work Plan. The first sample collected at any location will be "01", the second "02", etc.

QA/QC sample identifiers will include "FD" for field duplicate, "FB" for field blank (the site, location, and sequence number for field blanks is the same as the sample taken immediately after the field blank), "MS" for matrix spike, and "MD" for matrix spike duplicate. For trip blanks the "site" will be "TRB", the media will be "GW", the location will be "MMDD" (two-digit numbers for the month and date of shipment), and the sequence number will be the "cooler number" for that day's shipment [TRB:GW:0630-02 would be the second cooler of groundwater VOC samples shipped on June 30th].

SECTION 7
PROJECT MANAGEMENT PLAN

This PjMP is prepared as part of the Phase I RFI WP. This PjMP presents an overall management approach to the RFI and includes: (1) a discussion of the Technical Approach; (2) a Schedule of Activities; (3) a description of personnel directing the Phase I RFI, including subcontractors; and, (4) a provision for submittal of periodic progress reports. These items are discussed in the following paragraphs.

7.1 Project Objectives

The Hazardous and Solid Waste Amendments of 1984 (HSWA) require that releases from SWMUs be evaluated for all RCRA Facilities seeking a permit. The evaluation of releases helps to establish the need for corrective action at RCRA Facilities. The evaluation of releases has been formalized in the procedures of the RFA. The RFA is typically composed of a Preliminary Review (PR), a VSI and where appropriate, a Sampling Visit (SV).

Jacobs was contracted by the U.S. EPA, Region 5, through Metcalf & Eddy to perform the RFA at the CWM-Vickery TSD Facility. The U.S. EPA directed Jacobs to report on all SWMUs at the facility with the exception of the hazardous waste (Class 2) injection wells. The injection wells are regulated under a separate authority. Jacobs conducted the VSI during May, 1990 and identified 45 SWMUs and 5 areas of concern. An additional 8 SWMUs and 4 Areas of Concern have been identified since the RFA by Jacobs. The SWMUs have been grouped together for the Phase I RFI. Table 4-1 (presented at the end of Section 4.0) summarizes the groupings and rationale behind each grouping. A detailed discussion on the groupings is contained in Section 5.0.

The Phase I RFI at the CWM-Vickery TSD Facility is specifically focussed on determining if releases have actually occurred. This will be accomplished by determining if there are any hazardous waste constituents in the soils adjacent to and underlying the identified SWMUs and AOCs, or in the sediments of surface streams draining the site. If so, the Phase I RFI report will propose specific and focussed investigations to assess the extent and risk-impact of those releases, including investigation of groundwater. The groundwater pathway and the off-site surface water receptors will be evaluated during the Phase I and Phase II RFIs and therefore will eliminate the need for a Phase III.

The characterization of the groundwater in the areas around the SWMUs and AOCs will be initially made by using a combination of the soil sampling proposed in this Phase I WP and by investigative groundwater sampling within five on-site groundwater monitoring wells, supported by recent historical groundwater monitoring data. The soil sampling data will be used to determine if releases have occurred in certain SWMUs and AOCs. If the soils are found not to contain contaminants, the presence of groundwater contamination remains unlikely. Additionally, the complete review of the groundwater data for validity of where this data may be applied will be completed to identify areas of groundwater concern.

7.2 Technical Approach

In order to characterize the site and determine the potential risks to human health and the environment each of the 53 SWMUs and 10 AOCs must be characterized. The objectives for this Phase I RFI is provided in Section 4.0 of this WP. The technical approach for sampling at each of the group's of SWMUs and AOCs is provided in Section 5.0.

7.3 Project Schedule

Tables 7-1A and 7-1B present the estimated schedules for completion of the Phase I RFI. These schedules have been based on the approval date of the Phase I RFI WP and QAPjP and include the U.S. EPA review periods. Implementation of the Phase I RFI has been divided into discrete phases and tasks to indicate the coordination of parallel and consecutive elements through completion of the project. Descriptions of each task are provided in the Phase I RFI WP.

7.4 Project Organization

The overall project management organization for this Phase I RFI is shown on Figure 7-1. Overall responsibility for completion of the Phase I RFI is centered around the Rust PM. The Phase I RFI project supervisors will be directly responsible for the coordination and implementation of their respective elements of the project. Resumes of key project personnel are contained in Appendix B.

GP Environmental Services, Inc. will be the primary analytical contractor for this project. Analysis will be performed at the Gaithersburg, MD facility. Triangle Laboratories, Durham, NC , will be retained by GP Environmental to perform the dioxins/furans analysis required for the soils, sediment and groundwater samples. All geotechnical samples will be performed at Rust's Cincinnati, Ohio Geotechnical Laboratory.

The CWM Project Manager will be Steve Lonneman. Mr. Lonneman will act as the contact between regulatory agencies, CWM and the subcontractors.

<u>Edward Need, P.G.</u> will serve as the Rust project director (PD) will be responsible for all technical elements of the sampling. The Rust PD:

- Reviews and approves field operating procedures;
- Provides senior technical oversight and coordination of the overall project;
- Assures that approved procedures meet QA/QC objectives of the project; and,
- Responsible for implementation of recommendations made by the QA/QC manager.

<u>Michael Bedard, P.E.</u> will service as the Rust PM and will be responsible for management of Rust field staff and project costs. The Rust PM's responsibilities include:

- Day to day direction of field staff and subcontractors;
- Resolution of any problems related to personnel, material or equipment; and,
- Communication of project progress to Rust PD and CWM PM.

<u>Michael Christopher</u> will serve as QA/QC manager and be responsible for all procedures and tasks pertaining to quality assurance on this project. The QA/QC Manager's responsibilities include:

- Monitoring project activities to verify compliance with QA/QC Plans;

- Implementing routine QA/QC audits for all technical deliverables; and,

- Preparation and review of all corporate QA/QC guidance documents that pertain to the Phase I RFI.

Martha Costello will serve as Project Health and Safety Coordinator and will coordinate required training and safety documentation.

Tony Noce will serve as the data validator for this project. Data validation will be performed following U.S. EPA contract laboratory program, national functional guidelines for organic data review (EPA 540/R-941012, February 1994) and U.S. EPA contract laboratory program, and national functional guidelines for inorganic data review (U.S. EPA 540/R-94013, February 1994). All organic and inorganic data will be evaluated and validated according to EPA Region 5 Data Validation Criteria.

The Rust Field Team Leader will coordinate all daily field activities performed by the field sampling team, drilling subcontractor, and GPR Subcontractor. The Field Team Leader will also be responsible for sample collection and shipment of samples to the laboratory and the preparation of daily reports. The Field Team Leader will report directly to the Rust PM.

GP Environmental Services, Inc. will provide analytical services for the implementation of this WP. GP Environmental Services is a participant in the U.S. EPA Contract Laboratory Program (CLP).

Triangle Laboratories, Inc. will provide analytical services for the analysis of dioxins/furans.

Rust Environment & Infrastructure, Cincinnati, Ohio Geotech Lab will provide the geotechnical analytical services during the RFI.

Geophysical Survey System, Inc. (GSSI) will perform ground penetrating radar services subcontractor. GSSI is a designer and manufacturer of ground penetrating radar systems and offers field survey services.

Bowser-Morner, Inc will be retained as the drilling subcontractor. Bowser-Morner, Inc. has provided drilling services on several projects at the CWM-Vickery TSD Facility and is familiar with all site requirements. The drilling subcontractor will be responsible for providing all drilling equipment, sampling equipment and decontamination of the drilling and sampling equipment.

7.5 Site Management

The Field Team Leader will manage field operations and is responsible for implementation of health and safety procedures, restricting site access during the course of the work, and utility clearances. The Field Team Leader will report directly to the Rust PM and interact directly with the project health and safety coordinator. The Field Team Leader will generally be the project field geologist/hydrogeologist who will also be directly responsible for data collection activities. The Field Team Leader will be familiar with all aspects of the WP and will confirm sampling activities and locations with the Rust PM. All daily site activities will be recorded on a Daily Report Form. The Daily Report Form is presented on Figure 7-2.

Experienced technicians will be utilized for support activities including equipment decontamination and field instrument calibration, operation of field screening instrumentation, sample packaging and shipment, and assistance with documentation of field activities.

A temporary office will be established on-site during the Phase I RFI. The office will house project files, field equipment, and samples awaiting transport to the analytical laboratory. The office will be locked during any absence by field personnel. The office will provide communications. Capabilities for on-site personnel and will allow more effective management of the RFI by helping office PMs expedite equipment and personnel to the site. The office will be especially valuable as a Health/Safety staging area prior to site entry or after complete decontamination during field activities and will provide immediate emergency communication capabilities.

7.6 Progress Reports

During the Phase I RFI, the Rust PM will prepare and submit status reports to the CWM PM for each calendar month of the project. The CWM PM will submit these reports to the U.S. EPA

Project Manager by the 15th day of the following month. These reports will contain the items listed below as on-hand at the Facility on the last day of each calendar month:

- A description and estimate of the percentage of the Phase I RFI completed;
- Summaries of all findings;
- Summaries of all changes made in the Phase I RFI during the reporting period;
- Summaries of all contacts with the public regarding the Phase I RFI;
- Summaries of all problems or potential problems encountered during the reporting period;
- Actions being taken to rectify problems;
- Changes in personnel during the reporting period;
- Project work for the next reporting period; and,
- Copies of daily reports, inspection reports, laboratory and monitoring data, etc.

SECTION 8
PUBLIC INVOLVEMENT PLAN

Involving the public is an important aspect of the RFI process. The PIP keeps the community informed of Phase I RFI activities at the site and helps the agency anticipate and respond to community concerns. The PIP will include the following:

- Communicating effectively with people through the Public Information Committee;
- Preparation of fact sheets summarizing current or proposed Phase I RFI activities; and,
- Maintaining an easily accessible repository of information including the permit plans and reports.

These items are discussed in the following paragraphs.

8.1 Public Information Committee

Communication will be maintained with the public through the meetings of the Public Information Committee (PIC). This committee has been established and includes members of the OEPA, members of the Sandusky Board of Health and three private citizens. The PIC will meet not more than on a monthly basis to review the project status and progress. The committee will be responsible for disseminating information to the public.

8.2 Fact Sheets

Fact Sheets, as necessary, will be prepared by CWM-Vickery and made available to the PIC. These sheets will also be available at the Fremont Public Library. These fact sheets will be prepared periodically throughout the Phase I RFI and reviewed by the U.S. EPA prior to distribution.

8.3 Repository of Information

The Fremont Public Library will be the repository for all reports pertaining to the RFI. This includes all draft and final reports and copies of news releases and clippings. CWM-Vickery will provide the repository with revised information when applicable. CWM-Vickery's contact for the repository will be Steve Lonneman.

SECTION 9
RFI REPORT

The information gathered as part of the RFI will be used to develop a report that documents the characterization of the nature and extent of contamination around the SWMUs and AOCs. Information collected will be used to supplement and verify the existing information on the environmental setting at the facility. Detailed hydrogeological and geological investigations and assessments have been performed at the facility and additional work is not proposed as part of this Work Plan to gather information about the hydrogeology and geology. However, during the RFI and drilling of soil borings, soil boring logs and other pertinent information concerning the environmental setting of the site will be collected for confirmational purposes. This information will be presented in the RFI report.

9.1 Presentation of Data

The laboratory analytical results will be summarized in tabular form and all supporting data will be properly referenced. Any other pertinent support data, including graphs, equations, references raw data, etc., will be included. Data presentation is described in Section 6.0, the Data Management Plan.

The following information will be provided as part of the RFI report:

- A discussion of the regional and site specific geologic and hydrogeologic characteristics will be summarized using existing information and any other additional information obtained during the RFI.

- An analysis of any topographic features that might influence the groundwater flow system at the site. This analysis will be completed in conjunction with the review of existing groundwater quality data.

- A characterization of each SWMU and AOC will be provided. This will include which areas are potentially affected by contaminant releases, if any. Information will be provided on the nature and horizontal and vertical extent of contamination to soil, groundwater, and sediment. The report will also identify the impacts to potential receptors.

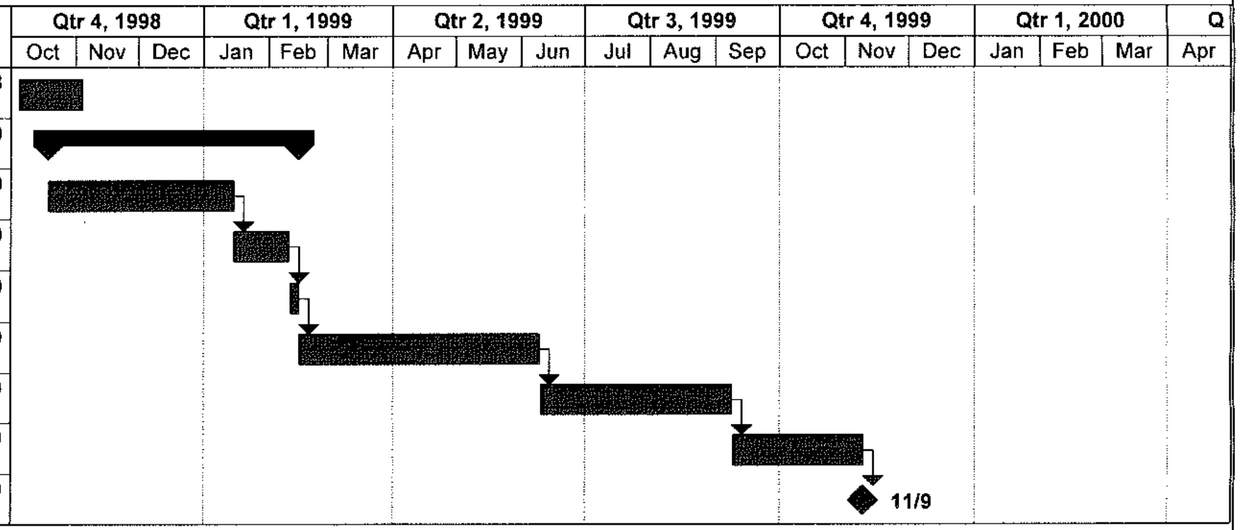
The following drawings, at a minimum, will be provided as part of the Phase I RFI report:

- Site Map;
- Sample Location Map(s);
- Soil Sample Concentration Map(s); and,
- Geologic Cross Sections.

The Phase I RFI report will discuss the contaminants identified, if any, and their behavior, stability, mobility and other relevant characteristics that may affect their migration. If necessary, recommendations for RFI activities (soil, sediment, groundwater and surface water) will be provided based on the results of the Phase I RFI.

Table 7-1A
RFI Phase I Schedule of Activities
CWM-Vickery

ID	Task Name	Start	Duration	Finish
1	**Mobilization**	10/5/98	18d	11/4/98
2	**Field Investigation**	**10/19/98**	**62d**	**2/15/99**
3	SWMU Groups A through I	10/19/98	45d	1/15/99
4	Areas of Concern	1/15/99	15d	2/10/99
5	Groundwater Sampling	2/11/99	2d	2/15/99
6	**RFI Final Report**	2/15/99	66d	6/9/99
7	**EPA Review**	6/10/99	52d	9/8/99
8	**Address Comments**	9/9/99	35d	11/9/99
9	**Submit Final Report**	11/9/99	0d	11/9/99



Project: CWM-Vickery RFI Work Plan
Date: 8/24/98

Task | Summary | Rolled Up Progress
Progress | Rolled Up Task
Milestone | Rolled Up Milestone

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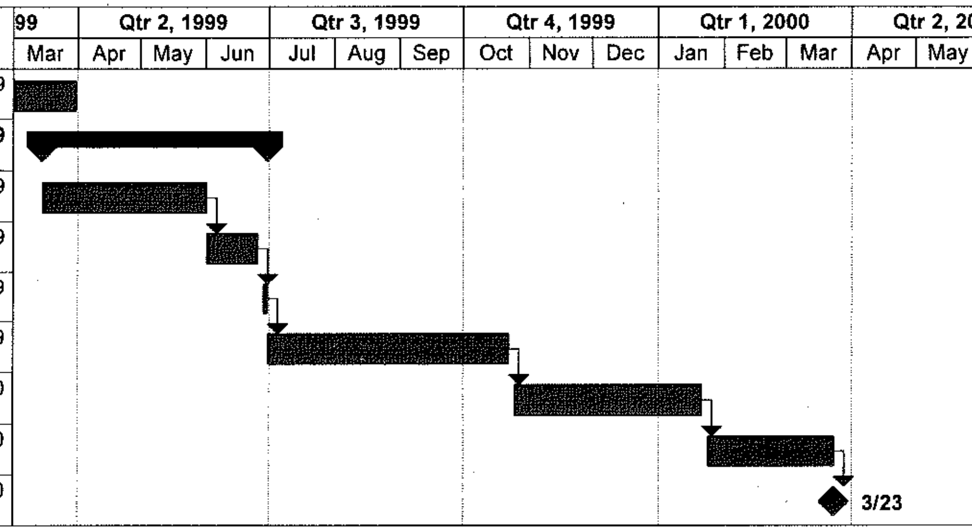
Table 7-1B
RFI Phase I Schedule of Activities
CWM-Vickery

ID	Task Name	Start	Duration	Finish
1	**Mobilization**	3/1/99	18d	3/31/99
2	**Field Investigation**	**3/15/99**	**62d**	**6/30/99**
3	SWMU Groups A through I	3/15/99	45d	6/1/99
4	Areas of Concern	6/1/99	15d	6/25/99
5	Groundwater Sampling	6/28/99	2d	6/30/99
6	**RFI Final Report**	6/30/99	66d	10/22/99
7	**EPA Review**	10/25/99	52d	1/21/00
8	**Address Comments**	1/24/00	35d	3/23/00
9	**Submit Final Report**	3/23/00	0d	3/23/00



Project: CWM-Vickery RFI Work Plan
Date: 8/24/98

Task | Summary | Rolled Up Progress
Progress | Rolled Up Task
Milestone | Rolled Up Milestone

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